The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 111, NO. 8 — COPYRIGHT, 1938, BY AMERICAN MEDICAL ASSOCIATION — CHICAGO, ILLINOIS — AUGUST 20, 1938

SOME NEUROLOGIC ASPECTS OF PSYCHIATRY

CHAIRMAN'S ADDRESS

SAMUEL D. INGHAM, M.D.

LOS ANGELES

Psychiatry, as a department of medical science, has been having a hard time keeping pace with the other departments of medicine, and it is commonly accused of being unscientific, of being a philosophy rather than a science. With the present day progress in psychiatric research, this indictment is no longer a true one, and the science of psychiatry bids fair to assume a leading position by its contributions to the welfare of the human race.

Modern psychiatry, the science of human behavior, has been built as a superstructure on the foundation of psychology, neurology and biology. Until recently neurology and biology have contributed comparatively little, and psychology has taken the leading role as a basis for psychiatric observations and analyses. In the past half century since Bastian wrote "The Brain as an Organ of Mind," neurology and biology have made notable advances and have furnished data by means of which it is possible to find more and more correlations of structure and function as regards the brain, and a better appreciation of the physical basis of human behavior.

The superstructure of psychiatry is far from being completed and there is no prospect that it ever will be, but more advancements are being made today than ever before. Many research workers are constantly contributing new material in the basic sciences, others are consolidating the material and fitting it into the foundation, while still others are improving the general architecture of the superstructure and harmonizing its different departments that each may be more useful to the others. Today more than ever before psychology, psychiatry and neurology are interlaced and interdependent, and workers in each of these special fields are not only adopting material from the others but are contributing valuable material to the others.

From the time when the human race was endowed with intelligence sufficient for introspection and came to realize that man was born to die, philosophers have struggled with conceptions of the soul and the body and of the relationship of mind to matter. Only during the past century has the conception developed that the mind is not something apart and independent of the body, but today it is generally conceded that, in the last analysis, all thought and all behavior are the results of physical and chemical reactions in living tissues. It is with this point of view that neurology seeks to find correlations of structure and function with regard to mental processes as well as in the sensory and motor phenomena, in which so much success has been attained.

Neurology deals primarily with the correlations of structure and function, utilizing all available evidence from biology and the contributory sciences. It has largely ignored the analysis of personality and has preferred to study physical phenomena, thus exposing itself to the charge of being "materialistic." It is my purpose in this discussion to review briefly some of the concepts of neurology with regard to the problems of psychiatry, although such concepts are admittedly in part theoretic and hypothetic.

Among the contributions of biology, the theory of neurobiotaxis developed by Kappers deserves consideration here in view of its apparent applicability in explanation of the development and functioning of the nervous system. According to this theory activity in living cells causes electrical polarization, and in nerve cells this is an important factor in the formation of the cell processes. The axon develops from the positively charged part of the cell, a nodal point, and the dendrites from the negative surface, which is undifferentiated. The processes continue to extend until synapses are established, the axon growing in the direction of the predominating action currents and the dendrites toward the source of action currents which reach the cell from outside. This process is not only active during the period of embryonic development but continues throughout life and is apparently an important factor in the formation of synapses and in the building up of "engrams." If this theory is valid it goes far to explain on a physiologic basis the processes of memory and learning, the formation of habits of thought and action, and the mechanism of conditioned reflexes and of mental activities in general. It also contributes evidence in support of the theory of inheritance of acquired characters in the evolutionary sense so far as the anatomic arrangement of cell groups and fiber tracts of the nervous system seem to have shifted in the course of evolution in conformity to this theory and have become established by heredity. Kappers states: "This fundamental law of neurobiotaxis not only shows that the well known law of association in psychology is a neurobiotactic law, but it also indicates how wonderfully polarized is the whole process of tract formation, and how well this process fits into the class of bioelectric phenomena" and "This law has long since been acknowledged to be one of the major laws governing the development of our mental capacities, that is, the law of mental association."

Read before the Section on Nervous and Mental Diseases at the Eighty-Ninth Annual Session of the American Medical Association, San Francisco, June 15, 1938.

The theory of neurobiotaxis has been utilized in the development of the following concepts as a supplement to the well known principles of neurophysiology and cerebral localization.

CONSCIOUSNESS

The neurologic concept of consciousness is that it is a state of activity of the entire nervous system, and in particular of the brain, which varies quantitatively from the maximum degree of mental action to complete inactivity, as in coma or general surgical anesthesia. Although all parts of the brain may contribute to the mental processes during consciousness, mental activity of all kinds appears to depend on the normal functioning of groups of neurons in the primitive diencephalon. The normal cycles of sleeping and waking are evidences of the physiologic activity of this mechanism. As it would appear that energy liberated in the diencephalon is essential for the activation of all the rest of the nervous system so far as psychologic phenomena are concerned, it may be postulated that the "center" of consciousness is located in this region, and much clinical and experimental evidence supports this view. It is surely not accidental that other primitive functions of the nervous system related to the vegetative processes, instincts and emotions have been found to be dependent on structures in the basal region of the brain in close proximity to those postulated as the center of consciousness. The application of this concept of consciousness to psychiatry seems obvious, since quantitative variations of consciousness are manifested in disturbances of behavior in terms of intelligence, emotions and instinctive action.

INSTINCTS, EMOTION AND INTELLIGENCE

There has been much discussion with regard to the nature and classification of instincts, but it is generally agreed that they represent innate biologic patterns of behavior characteristic for each animal species and from which are derived the motivations of all psychologic activity. Instinctive reaction patterns of behavior tend to promote the development and welfare of the individual, the reproduction of the species and the mutual benefits derived from adjustments within the social group.

In view of the accepted structure and function relationship it must be assumed that instinctive dispositions are represented anatomically by inherited neural patterns of inconceivable complexity and are probably located in the diencephalon in proximity to centers which are concerned with the regulation of vegetative functions, emotional reactions and consciousness. We can postulate, although we cannot demonstrate, differences in the neuron patterns of the diencephalon to account for the differences in the instinctive behavior of dogs and cats; and the same conception may be applied in explanation of the different inherent human personality traits.

Emotion and affectivity are essentially components of instinctive action. In each instinctive attitude is included a characteristic emotional or affective element, and this implies that each of the neuron groups representing the different instinctive attitudes is closely connected with the neuron group representing a particular type of emotional reaction. In personality analysis, emotional expressions are most valuable clues by which to detect instinctive motivations. Dissociation of the normal relationship of instinctive motives and their appropriate emotional expressions are common in mental disease and are strongly suggestive of derangements of neural patterns in the diencephalon.

Intelligence has been variously defined but in its broadest application implies the capacity to learn and profit by experience; to make observations, to remember, classify, analyze and synthesize experiences, and to utilize what has been learned to promote the success of the impelling force of instinct. By this definition the ants and bees are endowed with an elementary type of intelligence so far as they utilize the memory of their sensory observations in the performance of instinctive acts, and it seems obvious that all instinctive adaptations to environment require elementary intelligence. Instinctive movements are futile unless adapted to environment, and adaptation requires observation and memory. On the other hand, intelligence is as inert as a book on a shelf unless motivated by some instinctive interest or drive. A strong instinctive motivation with its appropriate emotion utilizes only that part of the intellectual field that applies to the situation at hand and inhibits all other sensations and thoughts. Instinct, learning and intelligence are inseparable in respect to their normal functioning, although they are to some extent localizable in different parts of the brain, and defects in behavior can to some extent be diagnosed neurologically.

Human intelligence is predominantly dependent on the cerebral cortex and association tracts. Posterior to the motor area the brain is arranged for the acquisition of knowledge. Here are located all the primary and secondary sensory areas and their subcortical connections which provide for the following activities: reception and elaboration of sensation; retention in memory and the formation of concepts; orientation, symbolization, calculation and discrimination. Anterior to the motor area the frontal lobes synthesize the information collected by the posterior areas, form judgments, develop and supervise the more complicated plans, and represent intelligence in respect to morals, ethics, wisdom and diplomacy.

HYPOTHETIC LEVELS OF PSYCHOLOGIC FUNCTION

In the neurologic analysis of motor functions it has been found useful to study the different stages or levels of motor integration and their relationship to the structural arrangement of the nervous system. The same plan may be applied in the analysis of psychologic integration, and the following outline is suggested with the full realization of its inadequacy and of the wide borderlines and extensive overlaps between the different hypothetic stages.

1. The first level, that of sensory perception, is represented anatomically by the cortical areas in which the various sensory tracts from the periphery terminate. The location of these areas is fairly well known for each type of sensation, and lesions affecting them cause impairment of sensations.

2. The second level, that of sensory integration, is concerned with the sensory memories, the retention, recognition and recall of sensations; also with discrimination in respect to similarities and differences of sensations experienced. Spatial and temporal relations and the identification of objects, symbols and colors are effected by sensory integration. The cortical areas corresponding to this level are adjacent to the primary areas for each type of sensation. Lesions affecting these areas cause impairment of sensory memory, either of recognition or recall or both; and varying types and degrees of agnosias, including the so-called sensory

aphasias, simultanagnosia, constructive apraxia, disorientation and Gerstmann's syndrome.

3. The third level may be considered to consist of the integration of various sensations related to the same experience by the process of associations or associative memory, and their translation into meanings and concepts. Recognition, discrimination and recall are here operating in the collective sense so far as the various memory areas representing the different types of sensation contribute to a common concept or idea. Anatomically, this stage of integration is represented by the subcortical association and commissural tracts connecting the various secondary cortical areas, and the interruption of these tracts causes impairment of associative memory and of the availability of concepts.

4. At the fourth level, or perhaps at an earlier stage, sensation synthesized into meaning awakens interest in the form of some instinctive disposition which determines the type of behavior which is to result. Characteristic emotions are manifested, and a general attitude of animation results which calls for action. The anatomic areas which seem to be of prime importance in relation to the instinctive motivations and emotional expressions are generally considered to be in the diencephalon.

5. The fifth stage of psychologic integration is the utilization of intelligence and all of the physical capacities of the organism for the purpose of attaining the objective demanded by some particular instinctive motivation. This process includes a more or less extensive analysis of the situation and the formation of a plan of action. All parts of the brain are utilized in this stage, although special patterns are selected which are appropriate and applicable to each situation, while others are inhibited.

6. The sixth stage of this hypothetic series is that of execution of the plan, or voluntary action. This includes voluntary motions critically directed, and modified or changed according to changing circumstances throughout the duration of the action. This process also requires constant observations, concentration of attention and a continuation of the activity of the intelligence, interest and emotions. At this level the motor areas of the brain, in particular the precentral and the premotor convolutions, are concerned, as are also the subcortical tracts leading into the motor region, and the projection tracts to the periphery. In addition to the familiar types of paralysis resulting from lesions of the motor areas and tracts, lesions of the subcortical association and commissural tracts connecting with the motor cortex give rise to ideokinetic and sympathetic apraxia.

The anatomic pathways in this series of activities would include (1) sensory end-organ and afferent pathway to primary sensory cortex, (2) primary sensory cortex to secondary (adjacent) area, (3) secondary area to other secondary areas via association tracts, (4) secondary areas for sensation to thalamus and hypothalamus, (5) basal region to adjacent vegetative and emotional centers and to widespread cortical areas, (6) convergence of impulses to the precentral (and premotor) cortex, and via projection tracts to the muscles.

The brain might be compared to a radio receiving set, the sensory end-organs representing the antennas, the afferent tracts the lead-in wires; in the brain are the amplifiers, condensers, shunt circuits, resistances, potentiometers, on-and-off switches, selectors and transformers. A and B currents are utilized, and ions are traveling in all directions in tuned circuits. And, curiously enough, to carry the analogy a little further, the net result of much activity is frequently blatant sounds from the loud speaker.

With the foregoing conception of the successive levels of psychologic integration and of the activities implied as occurring at each level, the broader concept of "total personality" may be developed.

The neurologic concept of the total personality is complex and consists of concepts of each of the numerous factors into which personality can be divided. It provides for each factor of personality a structural basis and a physiologic activity. It postulates the inheritance by each animal of a nervous system characteristic of its species and variable with the individual, which determines definitely the capacities and the limitations of all behavior. It applies the theory of neurobiotaxis as a working hypothesis which helps to explain embryonal development as well as the processes of learning, of thought associations, of habit formation and of the "conditionings" not only of reflexes but also of emotional and instinctive activities. It recognizes the effect of endocrine hormones in modifying behavior by their selective action of the cell patterns of the nervous system. It emphasizes the importance of the instinctive drives and of the neural patterns on which they are dependent. Personality characteristics are assumed to be predetermined to a large extent for each individual by inherited arrangements in the neuronal patterns in the diencephalon which represent the instinctive trends. It considers intelligence as the expression of the faculties of observation, memory, concept formation, thought association, discrimination, calculation, reason, judgment and wisdom and it accepts the view that these faculties are exercised solely in response to instinctive motivation. It visualizes "personality" as being in a constant state of flux which depends on internal or external environmental factors, either physiologic or pathologic, and as passing through various stages, or ages, of development.

The neurologic conception of "total personality" may be compared to the mechanic's conception of the "total automobile" with regard to the performance of the machine. When it is out of order the mechanic tries to locate the trouble, but he can do this only if he knows the structure and function of each part.

CONSTITUTIONAL PSYCHOPATHIC INFERIORITY

In people as in automobiles there is much variation with regard to performance, independent of any broken or worn out parts. In machines this is manifested in design and structural material, in degrees of power, speed, durability and appearance, and in the comfort, safety, satisfaction and service they provide, to which should be added the pride or humility they incite in those to whom they belong.

Neurologically conceived, constitutional psychopathic inferiority implies personalities which fail in some important adjustment to environment largely because of "constitutional" conditions with which they are born. Theoretically, this implies variation from the average "normal" in the arrangement of the inherited structural patterns of the brain cells. Since the behavior of psychopathic inferiors does not correlate with intelligence quotients and is characterized to a large extent by emotional instability, together with over or under developed instinctive trends, it may be inferred that the cell patterns in the diencephalon representing the instinctive motivations deviate from those of the nor-

mally adapted individual and that the cortical areas are not at fault in this condition. The relative fixity of personality traits, as compared to the capacity to acquire knowledge, may be explained by the representations of innate dispositions in the primitive structures while intelligence is the function of the neopallium. The manifestations of psychopathic inferiority (and superiority) vary in a sliding scale comparable to that of intelligence. It is to be regretted that we as yet have no easily applied or practical method of estimating the personality quotient as we have the intelligence quotient.

PSYCHONEUROSIS

By common consent the psychoneuroses are termed functional conditions, and the basic cause is said to be psychogenic. The symptoms are reactions to life's failures and are not due to pathologic changes in the tissue. But to satisfy the concepts of neurology, the symptoms of the psychoneuroses require explanation, at least in theory, in terms of physical activities in the nervous system. A clue to the answer may be found in Pavlov's report of the development of neurosis in a dog under experimental conditions. Here the neurosis appeared when, after conditioned reflexes had been successfully developed, the dog was unable to discriminate between the changing signals and he failed in his adaptations. In theory the correlated physical activities may in part be conceived as follows: During the period of the successful development of conditioned reflexes, reflex patterns, or engrams, were developed by the process of neurobiotaxis. So long as the dog's adaptations were successful, no harmful emotional tension resulted. Failure to interpret correctly the signals resulted in the distressing emotions of uncertainty, confusion and frustration. May it not be conceived that distressing emotions are physically the expression of spreading and diffuse currents of polarization with cross currents which tend to disrupt the unstable engrams of recently formed conditioned reflexes, and to a less extent the more stable engrams of normal behavior? This concept may be an idle flight of fancy, but is not the neurologist, as well as other theorists, entitled to exercise imagination?

The variability of individuals with regard to the tendency to develop psychoneuroses remains to be explained. In this respect the innate structural arrangement of the nervous system is a factor, as in the case of psychopathic inferiority; many writers consider the neuroses to be in a large extent the expression of inferiority. Another factor to be considered is that of hypoplasia of the nervous tissue, comparable to hypoplasia in various other tissues. May not neurasthenia be in part the expression of such hypoplasia?

PSYCHOSES

In the field of the psychoses the accumulations of biologic science have promoted the correlations of mental symptoms and changes of personality with physical changes in the brain in terms of neuropathology and biochemistry, including hormonal reactions and electrical polarizations. In the classification of mental diseases only two important groups still remain in the list of the so-called functional psychoses; viz., manic-depressive and schizophrenia. These still defy analysis with regard to the basic etiologic factors or the physical conditions in the brain cells which are manifested in symptoms. In both of these groups the abnormal behavior indicates disturbances in the patterns of instinctive motivation and emotion rather than of intelligence. The ups and downs of the cyclothymics may be conceived to correlate with corresponding degrees of cellular activity and polarization in the diencephalon, without disarrangement of the patterns as such, while in schizophrenia the symptoms of dissociation of the instincts, emotions and intelligence suggests a disarrangement of the neuron patterns and inharmonious polarizations in the basal region in which instinctive motivations arise. It seems probable that, to a certain degree, the same factors are at work in these two types of psychoses that are recognized in the etiology of the psychoneuroses, viz., the secondary effects of frustrations; but this theory is inadequate to explain these psychoses.

The neurologic approach to the problems of psychiatry is physiologically analytic and diagnostic, not therapeutic, and it can never replace psychologic analysis; but it contributes to the science of psychiatry in that it broadens the concepts of the relations of the structures of the nervous system with the manifestations of behavior.

In conclusion it may be stated that neurology has made its share of contributions to the science of psychiatry, and it should be emphasized that the neurologic aspects of psychiatry must be correlated with the psychologic aspects to attain the best available conception of human personality and its deviations from normality.

727 West Seventh Street.

ACUTE GLOMERULONEPHRITIS WITH SPECIAL REFERENCE TO THE COURSE AND PROGNOSIS

A STUDY OF 150 CASES

FRANCIS D. MURPHY, M.D.
AND
J. W. RASTETTER, M.D.
MILWAUKEE

Although there is extensive literature on the subject of acute nephritis, some of its practical aspects appear to escape recognition or to be regarded too lightly. If the classic textbook picture of hematuria, hypertension and edema is considered essential for a diagnosis of acute nephritis, then many milder forms will pass unrecognized, and not until years later, when chronic nephritis has set in, will the true significance of the mild early episode become apparent.

While the opinion is not unanimous that chronic glomerulonephritis is always a consequence of an acute form, in many cases the chronic form is observed to evolve from an acute attack, either immediately by direct continuity or after a succession of relapses and remissions during which the patient is apparently well. The absence of a history of an acute attack in many cases of chronic nephritis may be explained to some extent by the fact that during the acute phase the classic picture of hematuria, edema and hypertension was lacking. A stumbling block in the proper appraisal of acute nephritis has been the limited view taken of the cause and pathogenesis by many observers. Formerly, hematuria, edema and hypertension were

Because of lack of space this article is abbreviated in THE JOURNAL. The complete article appears in the authors' reprints.

From the Department of Medicine, Marquette University School of Medicine, and the Medical Clinic, Milwaukee County General Hospital.

Read before the Section on Practice of Medicine at the Eighty-Ninth Annual Session of the American Medical Association, San Francisco, June 17, 1938.

required for a diagnosis, but within recent times the concept of acute nephritis has changed. It has been emphasized that mild subclinical forms may exist, pass undiagnosed and untreated, and progress insidiously into the chronic stage before it is realized that the kidneys have become irreparably damaged. This concept has been confirmed and extended recently by the histologic examinations of Bell,[1] who stated that there are innumerable transitions between subclinical glomerulitis and clinical acute nephritis and that fundamentally the same type of reaction occurs in the two forms, the difference existing only in the intensity of the disease. This better understanding of the clinical and histologic features of acute nephritis removes one of the main obstacles which has retarded progress in this field.

TABLE 1.—*Comparison of Ages with Outcome in 150 Cases of Acute Glomerulonephritis*

Age, Years	Number of Cases	Patient Recovered: Number	Patient Recovered: Per-centage	Condition Became Chronic: Number	Condition Became Chronic: Per-centage	Patient Died: Number	Patient Died: Per-centage
0-10	26	12	46.15	11	42.30	3	11.53
11-20	52	26	50.00	20	40.00	4	8.00
21-30	27	12	44.44	10	37.05	5	18.51
31-40	25	13	52.00	7	28.00	5	20.00
41-50	15	7	46.66	4	26.66	4	26.66
51-60	4	2	50.00	1	25.00	1	25.00
61-70	1	0	0	0	0	1	100.00
Total	150	74	49.33	53	35.33	23	15.33

Our presentation comprises a study of 150 cases of acute glomerulonephritis observed in the acute stage and followed for periods varying from two to fourteen years. We have had the opportunity of observing some patients in the acute stage of nephritis who have passed through the transitional stage into the chronic phase and have seen renal insufficiency gradually develop and the patients die of uremia or of some other complication of chronic nephritis. The purpose of this report is to emphasize the following aspects of the problem of acute nephritis: (*a*) The importance of a number of diseases which may precipitate acute nephritis but are not generally considered as common etiologic factors. (*b*) The significance of early recognition of the signs and symptoms of milder forms of the disease. (*c*) The necessity of careful observation of patients in the quiescent period that often immediately follows the acute phase. In this period, which is called here the transitional stage, the sequelae, both immediate and remote, may be recognized and the patient may be protected from future ill consequences by judicious treatment. (*d*) The value of measures which aid in determining whether or not the renal lesion has completely healed. The vital importance of adequate treatment cannot be overestimated, for the patient who appears clinically cured may have some residual inflammation which may progress unless it is treated effectively.

CLINICAL DATA

The criteria for the diagnosis did not include definite retention of nitrogenous substances, hypertension, edema or hematuria. A patient who had albumin, red blood cells, casts and pus cells in the urine for a week or more was considered to have acute nephritis. In table 1 the age incidence is compared with the outcome. Of the 150 patients 105, or 70 per cent, were under 30 years of age. Of this number fifty-two, or 39.52 per cent, recovered; the disease of 41, or 39.04 per cent, became chronic, and twelve, or 11.43 per cent, died. Of the forty-five patients over 30 years of age twenty-two, or 48.88 per cent, recovered; the disease of twelve, or 26.66 per cent, became chronic, and eleven, or 24.44 per cent, died. This table emphasizes that acute nephritis in an older group is probably more serious and has a higher mortality rate than in a younger group. The patients were predominantly under 30 years of age, but only twenty-six, or 17.33 per cent, of the total were under the age of 10.

The age and sex incidence is given in table 2. In the age group below 10 years the boys outnumbered the girls almost 6 to 1, but this ratio did not prevail throughout the series. Of the total number of patients 102 were males and forty-eight were females, showing a ratio of about 2 to 1. Table 3 shows the relation of the age and sex to the progress of the disease. Of the seventy-four patients who recovered, or 49.33 per cent of the total series, fifty-two, or 70.27 per cent, were males and averaged 23.23 years of age. The number of females in this group was smaller, twenty-two, or 29.73 per cent, yet the average age was practically the same. In the group of patients who died, males predominated almost 3 to 1 and the average age of both sexes was higher than that of the patients who recovered or in whom the condition became chronic. Twenty-three, or 15.33 per cent, of the patients died; seventeen, or 73.91 per cent, were males and 6, or 26.09 per cent, were females. The average age of the males was 30.58 years and of the females 20.33 years.

In table 4 the antecedent diseases in 150 cases of acute nephritis are given. Formerly it was thought that severe infections such as scarlet fever and septic sore throat were the chief forerunners of acute nephritis, but now it is agreed that almost any infectious disease may precede the onset of renal inflammation. The commonest antecedent disorders in our series were diseases caused by streptococcic infections of the throat and upper part of the respiratory tract. Many authors [2] have stressed the importance of this relationship. The point of emphasis is that infections of the upper part of the respiratory tract which are often not thought of seriously may be forerunners of acute nephritis.

TABLE 2.—*Age and Sex Incidence in 150 Cases of Acute Glomerulonephritis*

Age	Number	Percentage of Total	Number of Males	Percentage of Total	Number of Females	Percentage of Total
0-10	26	17.33	22	14.66	4	2.66
11-20	52	34.66	27	18.00	25	16.66
21-30	27	18.00	17	11.33	10	6.66
31-40	25	16.66	21	14.00	4	2.66
41-50	15	10.00	10	6.66	5	3.33
51-60	4	2.66	4	2.66	0	0
61-70	1	0.66	1	0.66	0	0
Total	150	100.00	102	68.00	48	32.00

Nephritis followed such infections in ninety-nine, or 66 per cent, of our 150 cases. In 67.6 per cent of seventy-eight cases studied by Winkenwerder, McLeod

1. Bell, E. T.: Early Stages of Glomerulonephritis, Am. J. Path. **12**: 801 (Nov.) 1936.

2. Longcope, W. T.: Pathogenesis of Glomerular Nephritis, Bull. Johns Hopkins Hosp. **45**: 335 (Dec.) 1929. Volhard, F., in von Bergmann, G., and Staehelin, R.: Handbuch der innere Medizin, Berlin, Julius Springer, 1931, vol. 6, pt. 2, p. 1179. Fishberg, A. M.: Hypertension and Nephritis, Philadelphia, Lea & Febiger, 1934. Bell, E. T.: The Pathology and Pathogenesis of Clinical Acute Nephritis, Am. J. Path. **13**: 497 (July) 1937. Christian, H. A.: Types of Nephritis and Their Management, J. A. M. A. **102**: 169 (Jan. 20) 1934. Guild, H. C.: Prognosis of Acute Glomerular Nephritis in Childhood, Bull. Johns Hopkins Hosp. **48**: 193 (April) 1931. Boyd, G. L.: Acute Nephritis in Children, Canad. M. A. J. **17**: 894 (Aug.) 1927.

and Baker,[3] nephritis was preceded by infections of the upper part of the respiratory tract, which took the form of tonsillitis in 44 per cent. Reports from Gray,[4] Hill,[5] Osman,[6] Rake [7] and Bell and Hartzell [8] disclose the comparative insignificance of scarlet fever as a cause of acute nephritis. When it becomes more widely recognized that there is a tendency for nephritis to develop in patients with simple infections of the upper part of the respiratory tract and other pyogenic infections, repeated urinalyses will reveal many more cases of early acute nephritis.

TABLE 3.—*Relation of Age and Sex to the Progress of the Disease*

	Number	Percentage of Total	Number of Males	Average Age of Males	Number of Females	Average Age of Females	General Average Age	Youngest Patient	Oldest Patient
Patient recovered	74	49.33	52	21.23	22	21.09	21.18	3	50
Condition became chronic	53	35.33	33	21.96	20	18.74	20.74	4	51
Patient died	23	15.33	17	30.58	6	29.33	27.94	1	65
Total	150	100.00	102	24.65	48	20.98	23.06	1	76

Twenty-three of our patients with acute nephritis died, as seen in table 5, but only twelve of these, or 52.17 per cent, died of acute glomerulonephritis or uremia. Pneumonia, septicemia, burns, erysipelas and heart failure caused death in the remaining eleven cases. It is often difficult to determine the part played by nephritis in causing death and the part contributed by associated diseases. It has been our practice to consider nephritis as the primary cause of death unless some other obvious cause is found. When our death rate of 15.33 per cent is compared with that reported in studies of similar series (Richter [9] and McPhee and Kaye [10]) it appears to be rather high. The mortality rate depends to some extent on the social conditions of the patient and on the promptness with which adequate treatment is given.

TABLE 5.—*Causes of Death in Twenty-Three Cases of Acute Glomerulonephritis*

Cause	Total Number of Deaths	Percentage of Total	Number of Males	Number of Females	Average Age	Youngest Patient	Oldest Patient
Acute glomerulonephritis	12	52.17	8	4	28.91	3	50
Pneumonia	5	21.73	4	1	39.80	26	51
Septicemia	2	8.69	1	0	8.00	1	15
Burns	2	8.69	1	1	20.00	15	25
Erysipelas	1	4.34	1	0	65.00	0	65
Heart failure	1	4.34	1	0	43.00	0	43
Total	23	100.00	17	6	31.70	0	65

CLINICAL SYNDROMES

In acute nephritis, as in the chronic form, there are five clinical syndromes: (*a*) the urinary syndrome, (*b*) hypertension, (*c*) edema, (*d*) retention of nitrogenous products in the blood and (*e*) uremia. These syndromes need not all be present at one time; they are variable and transitory. One may develop and dominate the clinical picture for a period and then disappear temporarily or permanently. The clinical syndromes which occurred in the 150 cases under discussion are analyzed and their relation to the progress is shown in table 6.

(*a*) *The Urinary Syndrome.*—The urinary syndrome is the most important because it is always present, is the most accessible and is the least likely to be misinterpreted. The diagnosis of acute nephritis was not made in the absence of albuminuria in any case. Albuminuria must be considered evidence of nephritis unless it is proved otherwise. In many of our cases only the urinary syndrome was present when the diagnosis was made. In all cases albuminuria was accompanied by other changes in the urinary picture; the specific gravity was usually elevated, and red blood cells, pus cells and granular casts were present. In some cases it was difficult to decide whether the urinary changes only signified benign febrile albuminuria or were identification marks of a mild but genuine acute nephritis.

In our cases the albumin in the urine varied from a few grams to as much as 20 Gm. a day, but the quantity seemed to have little effect on the outcome. According to Bell [1] the amount of albumin does not correspond to the degree of glomerular damage because the most severely damaged glomeruli have closed capillaries and do not transmit albumin.

The term hemorrhagic nephritis is often used interchangeably with glomerulonephritis because in some cases of acute glomerulonephritis there is gross

TABLE 4.—*Antecedent Diseases in 150 Cases of Acute Glomerulonephritis*

Diseases	Number of Cases	Percentage of Total	Patient Recovered	Percentage of Total	Condition Became Chronic	Percentage of Total	Patient Died of Acute Nephritis	Percentage of Total	Patient Died of Other Causes	Percentage of Total	Total Number of Deaths	Percentage of Total
Infections of the upper part of the respiratory tract	99	66.00	43	28.66	42	28.00	8	5.33	6	4.00	14	9.33
Peritonsillar abscess	27	14.66	18	12.00	3	2.00	0	0	1	0.66	1	0.66
Cervical adenitis	6	4.00	5	3.33	1	0.66	0	0	0	0	0	0
Unknown	6	4.00	5	3.33	0	0	1	0.66	0	0	1	0.66
Surgical infections	5	3.33	1	0.66	3	1.33	2	1.33	0	0	2	1.33
Pyogenic infections	4	2.66	2	1.33	1	0.66	0	0	1	0.66	1	0.66
Burns	2	1.33	0	0	0	0	0	0	2	1.33	2	1.33
Purpura (toxic)	2	1.33	0	0	2	1.33	0	0	0	0	0	0
Scarlet fever	2	1.33	0	0	2	1.33	0	0	0	0	0	0
Erysipelas	1	0.66	0	0	0	0	0	0	1	0.66	1	0.66
Rheumatic fever	1	0.66	0	0	0	0	1	0.66	0	0	1	0.66
Total	150	100.00	74	49.33	53	35.33	12	8.00	11	7.33	23	15.33

3. Winkenwerder, W. L.; McLeod, Neil, and Baker, Myles: Infection and Hemorrhagic Nephritis, Arch. Int. Med. **56**: 297 (Aug.) 1935.
4. Gray, John: Causes and Sequences in Nephritis, J. Path. & Bact. **31**: 191 (April) 1928.
5. Hill, L. C.: Febrile Albuminuria, with Special Reference to Pneumonia, Quart. J. Med. **22**: 305 (Jan.) 1929.
6. Osman, A. A.: Aetiology and Prognosis of Acute Nephritis in Children and Young Adults: Clinical Study of Fifty-Six Cases, Guy's Hosp. Rep. **73**: 306 (July) 1923.
7. Rake, G. W.: The Role of Infection in the Aetiology of Bright's Disease, Guy's Hosp. Gaz. **42**: 242 (June 2) 1928.
8. Bell, E. T., and Hartzell, T. B.: Etiology and Development of Glomerulonephritis, Arch. Int. Med. **29**: 762 (June) 1922.
9. Richter, A. R.: Prognosis in Acute Glomerular Nephritis, Ann. Int. Med. **9**: 1057 (Feb.) 1936.
10. McPhee, I. M., and Kaye, Geoffrey: Some Observations on the Prognosis in Acute Nephritis, M. J. Australia **2**: 14 (July 2) 1932.

hematuria. In this series gross hematuria was present in forty-eight, or 32 per cent, of the cases; in the remainder red blood cells were found on microscopic examination of the urinary sediment.

(*b*) *Hypertension and the Heart.*—Hypertension was formerly looked on as a constant feature in acute nephritis. In table 6 the incidence of hypertension is given in relation to the ultimate outcome of the disease. When hypertension was present in our cases the systolic blood pressure ranged between 140 and 180 mm. and the diastolic between 90 and 110 mm. Hypertension may be absent throughout the course of the disease and yet chronic glomerulonephritis may develop; on the other hand, we have studied patients with excessive hypertension, prominent changes in the fundus oculi and hypertensive encephalopathy who have recovered completely.

The seriousness of acute nephritis depends at times not so much on the renal inflammation as on disturbances in the function of the heart. Myocardial insufficiency may develop, and there may be either frank heart failure or milder symptoms, such as palpitation, tachycardia, pallor, enlargement or pulmonary congestion. The excessive burden of hypertension cannot in most cases be held responsible for cardiac embarrassment; many authors have attributed it to a systemic vascular disorder due to the same agent that causes the acute nephritis. In table 5 it is shown that one of our patients died of heart failure, but this does not reflect the importance of cardiac insufficiency in the series, for in other cases myocardial damage was a prominent factor in the unfavorable outcome although it was not considered the primary cause of death. The role of myocardial insufficiency in acute nephritis varies according to different authors. In Cecil's [11] textbook it is stated that the heart as a rule is not damaged in acute nephritis. Levy [12] and Murphy, Grill and Moxon [13] discussed cases of acute nephritis in which heart failure occurred without hypertension. More recently Master, Jaffe and Dack [14] found cardiac insufficiency to be common in a series of twenty-four cases and at times to be severe enough to cause death. Rubin and Rapoport [15] studied the cardiac complications of acute hemorrhagic nephritis and concluded that the involvement of the heart is caused by a combination of hypertension and myocardial damage from infection. Hypertension was present in all their cases. They examined fifty-five children and found severe myocardial damage in fourteen and signs of frank failure in twelve.

(*c*) *Edema.*—Edema developed in eighty-six, or 57.33 per cent, of our 100 cases, but in no case was it a serious complication. As seen in table 6, there was no relationship between the degree of edema and the course of the disease. Puffiness about the eyes, slight ascites and swollen ankles were frequently observed, but as a rule when generalized anasarca developed the disease had passed from the acute stage of nephritis into the subacute or chronic form. From determinations of the plasma protein level it was found that the edema of acute nephritis in most instances preceded any pronounced changes in the plasma protein level, and there appeared to be no causal relationship between the two. In some cases of severe acute nephritis with prominent edema, the plasma protein level was found to sink gradually as the disease progressed. There may be three kinds of edema in acute nephritis,

TABLE 6.—*Syndromes in 150 Cases of Acute Glomerulonephritis*

Syndrome	Patient Recovered		Condition Became Chronic		Patient Died	
	Number	Percentage	Number	Percentage	Number	Percentage
Urinary	74	100.00	53	100.00	21	100.00
Hypertension	25	33.77	26	49.05	8	34.78
Edema	42	56.75	34	64.15	10	43.77
Nitrogen retention	23	31.08	25	47.16	18	78.26
Uremia (genuine)	0	0	2	3.77	8	34.78

the nephritic, the nephrotic and the cardiac, and it is the belief of Page,[16] Rennie [17] and Peters and Van Slyke [18] that in the earlier periods nephritic edema is caused by increased capillary permeability.

(*d*) *Nitrogen Retention.*—In sixty-six, or 44.44 per cent, of our 150 cases there was some degree of nitrogen retention. The level of blood urea nitrogen may be normal during the early periods of the disease and then rise suddenly after the first seven or eight days. Oliguria or even anuria is likely to be present in early acute glomerulonephritis, and, since the output of urea nitrogen is dependent on the amount of urine excreted, the nonprotein nitrogen level of the blood may rise swiftly at this time. After several days, however, diuresis usually sets in, and this is followed by a prompt reduction of the blood nitrogen. A gradual rise in nonprotein nitrogen over a period of three weeks, as shown by repeated examinations, is a grave prognostic sign.

(*e*) *Uremia.*—As seen in table 6, there were ten cases or 6⅔ per cent of the total series of 150 cases, in which there was genuine uremia. Uremia is a difficult syndrome to evaluate because the term is often used to describe both the genuine and the convulsive, or false, form of uremia. Convulsive uremia is identified by headache, visual disturbances and choked disks. It

TABLE 7.—*Sedimentation Rate of a Patient with Acute Glomerulonephritis Who Recovered*

Date	30 Minutes	45 Minutes	1 Hour	2 Hours
11/19/36	20	32	50	92
12/ 3/36	8	13	20	49
12/16/36	7	12	17	35
12/30/36	6	10	15	34
1/ 7/37	5	10	14	32
1/22/37	4	7	10	24
2/12/37	6	11	17	19
4/10/37	1	2	2	4
6/25/37	½	2	2½	10
8/20/37	1	2	3	8

is practically always associated with, and is probably caused by, hypertension; nitrogen retention and anuria are unrelated to its development. In sharp contrast to the convulsive form is genuine or true uremia, which is a manifestation of renal insufficiency and is unrelated to hypertension.

11. Cecil, R. L.: A Textbook of Medicine, Philadelphia, W. B. Saunders Company, 1937.

12. Levy, I. J.: Cardiac Response in Acute Diffuse Glomerular Nephritis, Am. Heart J. **5**: 277 (Feb.) 1930.

13. Murphy, F. D.; Grill, John, and Moxon, Gail F.: Acute Diffuse Glomerular Nephritis: Study of Ninety-Four Cases with Special Consideration of the Stage of Transition into the Chronic Form, Arch. Int. Med. **54**: 483 (Oct.) 1934.

14. Master, A. M.; Jaffe, H. L., and Dack, Simon: The Heart in Acute Nephritis, Arch. Int. Med. **60**: 1016 (Dec.) 1937.

15. Rubin, M. I., and Rapoport, Milton: Cardiac Complications of Acute Hemorrhagic Nephritis, Am. J. Dis. Child. **55**: 244 (Feb.) 1938.

16. Page, I. H.: The Management of Acute, Chronic and Terminal Bright's Disease, M. Clin. North America **18**: 867 (Nov.) 1934.

17. Rennie, J. B.: Edema in Nephritis, Quart. J. Med. **2**: 521 (Oct.) 1933.

18. Peters, J. P., and Van Slyke, D. D.: Quantitative Clinical Chemistry, Baltimore, Williams & Wilkins Company, 1932.

COURSE

Acute nephritis follows one of several courses: The patient may die in the acute attack, subacute or chronic nephritis may develop, complete healing may occur or slight albuminuria with no formed elements in the urinary sediment may persist for years. The last-mentioned type of development was pointed out by Addis [19] as an example of healing with defect. Most patients with acute nephritis recover within six weeks. In some cases healing appears to be complete when in reality the renal inflammation has only become less intense, and the patient is dismissed from further observation. He may be oblivious of the fact that the kidneys are damaged until years later, when evidence of permanent injury appears. It is therefore most important to determine whether or not the renal lesion has healed before dismissing a nephritic patient from treatment. After the severity of the acute phase has passed there is a period of transition during which recovery may occur or the disease may become chronic. Routine tests, such as the phenolsulfonphthalein test, analysis of the blood for retained nitrogen and determination of the blood pressure, may lead one to believe that the renal lesion is healing satisfactorily but more exhaustive examination may prove that this is not the case.

No one test has been found a reliable prognostic index in every case, but the result obtained from a combination of several measures may be used as a fairly accurate guide. A study of the dilution-concentration test of Volhard or one of its modifications, the blood urea clearance test, and determination of the sedimentation rate of the erythrocytes have been particularly helpful. The quantitative methods of urinalysis described by Addis [20] are of diagnostic and prognostic value, especially in determining whether the renal lesion is still active or is becoming latent. The blood urea clearance test as described by Möller, McIntosh and Van Slyke [21] was particularly helpful in the study of our cases. As reported previously,[14] the urea clearance test repeated over a period of weeks will show whether the trend is toward healing or chronicity. Cullen, Nelson and Holmes [22] made a study of the urea clearance of children recovering from acute nephritis for the purpose of detecting residual renal damage and found the test to be of value in determining the extent of the renal involvement during the acute stage of nephritis. The dilution-concentration test at times appears to be a more valuable aid than the other tests; yet an accurate prognosis depends not on any one test but on a composite picture of all tests. Alving and Van Slyke [23] have compared the prognostic significance of the urea clearance and dilution-concentration tests. Determination of the sedimentation rate of the erythrocytes has proved to be of distinct aid in prognosis. This, like the other tests, is not an infallible guide, since some patients with active lesions have a normal sedimentation rate. Within recent years Cutler [24] has emphasized the importance of using a standard method in performing the test, and he has pointed out its limitations in the field of internal medicine. Tables 7, 8 and 9 show variations observed in the sedimentation rate of three patients with acute nephritis; one recovered, another died and in the third the condition became chronic. We have found that, taken with the other tests, the determination of the sedimentation rate is a helpful prognostic aid. However, repeated tests at frequent intervals are necessary, since a single determination may lead to false impressions. When the renal lesion is becoming quiescent the rate falls, and when the lesion is progressing it is more rapid. The fact that the test is simple and easy to perform adds to its practical value.

TABLE 8.—*Sedimentation Rate of a Patient Who Died of Acute Glomerulonephritis*

Date	30 Minutes	45 Minutes	1 Hour	2 Hours
2/13/37	17	30	30	60
2/24/37	28	42	60	90
3/ 1/37	32	45	78	110
3/ 7/37	35	48	82	117
3/16/37	102	126	132	136
3/22/37	120	128	141	160

TABLE 9.—*Sedimentation Rate in a Case of Acute Glomerulonephritis Which Became Chronic*

Date	30 Minutes	45 Minutes	1 Hour	2 Hours
2/ 8/37	70	113	130	140
2/16/37	40	62	18	123
2/22/37	54	57	75	112
3/ 3/37	37	59	79	107
3/15/37	26	38	58	93
3/23/37	19	34	47	92
5/ 1/37	27	44	55	88
6/ 3/37	30	40	52	80
6/25/37	19	35	50	78
7/ 2/37	30	45	56	82

COMMENT

The recent publication of Baehr [25] emphasizes that there is no unanimity of opinion regarding the significance of the so-called milder forms of acute glomerulonephritis. He expressed the opinion that an early diagnosis can be made positively only if, in addition to the urinary abnormalities, there are other clinical evidences of vascular disturbances. Our observations convince us that there are mild forms of acute nephritis characterized by albuminuria, microscopic hematuria and casts which progress eventually into chronic glomerulonephritis without developing into the classic picture of gross hematuria, hypertension and edema. The fact that so many patients with chronic nephritis have no history of an acute attack may indicate that the first stage was so mild as to be unrecognized and that nephritis was not suspected until urinary abnormalities were discovered some time later. Whether chronic glomerulonephritis always evolves from the acute form is an unsettled question. Volhard [2] said that in every case chronic nephritis is the result of an unhealed acute form, but Aldrich [26] found no instances of chronic nephritis following an acute attack in 129 cases studied from one to twelve years. Aldrich and Boyle [27] said that in some cases glomerulonephritis develops slowly and insidiously without having had an acute stage. In a series of 186 cases of chronic nephritis, Nye [28] found

19. Addis, Thomas: A Clinical Classification of Bright's Disease, J. A. M. A. **85**:163 (July 18) 1925.
20. Addis, Thomas: Haemorrhagic Bright's Disease: Natural History, Bull. Johns Hopkins Hosp. **49**:203 (Oct.) 1931.
21. Möller, Eggert; McIntosh, J. F., and Van Slyke, D. D.: Studies of Urea Excretion: II. Relationship Between Urine Volume and Rate of Urea Excretion by Normal Adults, J. Clin. Investigation **6**:427 (Dec.) 1928.
22. Cullen, G. E.; Nelson, W. E., and Holmes, F. E.: Studies in Kidney Function in Children: Urea Clearance Values, J. Clin. Investigation **14**:563 (Sept.) 1935.
23. Alving, A. S., and Van Slyke, D. D.: Significance of Concentration and Dilution Test in Bright's Disease, J. Clin. Investigation **13**:969 (Nov.) 1934.
24. Cutler, J. W.: The Practical Application of the Blood Sedimentation Test in General Medicine: Observation Based on Approximately 5,000 Patients Over a Period of Six Years, Am. J. M. Sc. **193**:643 (May) 1937.
25. Baehr, George: The Nature of Glomerulonephritis, Bull. New York Acad. Med. **14**:53 (Feb.) 1938.
26. Aldrich, C. A.: Clinical Types of Nephritis in Childhood, J. A. M. A. **94**:1637 (May 24) 1930.
27. Aldrich, C. A., and Boyle, H. H.: Chronic Nonspecific Nephritis: Clinical Observations on Forty Children with Results of Treatment on Full Diets, J. A. M. A. **100**:1979 (June 24) 1933.
28. Nye, L. J. J.: Chronic Nephritis and Lead Poisoning, Sydney, Australia, Angus & Robertson, Ltd., 1933.

only two in which there was a history of acute nephritis or hematuria in any period of childhood. Although some patients with chronic nephritis have had renal inflammation earlier in life, Horder [29] stated that others are known to have been free from acute nephritis. Chronic nephritis is not a progressive disease varying in severity at different periods, according to Emerson,[30] but is rather a succession of distinct acute attacks distributed over a period of years, each adding to the permanent injury of the kidney as a whole.

In the opinion of such observers as Fishberg,[2] Bell and Hartzell,[4] Mosenthal,[31] Longcope [2] and Volhard [2] it is uncommon for acute nephritis to progress directly into the chronic stage. There are many intermediate phases that bridge the gap between the acute and the chronic. Occasionally, however, an acute attack is seen to pass directly into the chronic form. Roper [32] said "A silent period may ensue for years, during which time there are no symptoms," but he added that in other cases there is no silent period and the acute symptoms merge directly into chronicity. Addis [19] expressed the opinion that the patient with acute nephritis may pass into a latent stage which may persist for a long time.

Most authors accept the idea that unhealed acute nephritis may pass into a subacute form, but there are some who do not agree that a long period of latency or quiescence may endure in the kidney. Boyd,[33] Elwyn [34] and Fishberg [2] said that in order for nephritis to become chronic there must be some extrarenal infection which subjects the kidney to repeated infections or rather, repeated intoxications.

A point which deserves consideration is whether or not the course of acute nephritis can be influenced by the removal of septic foci. Platt [35] and Alport [36] expressed the opinion that there is evidence that this procedure exerts a favorable influence. The removal of the source of infection tends to slow down the progress of the disease, and the more promptly such foci are attacked the better for the patient. Guild,[2] from a study of thirty-four patients over a period of years, concluded that many patients return entirely to normal in spite of neglect of foci of infection after the attack of nephritis. Patients who continue to show red blood cells, albumin and casts in the urine after several months of rest in bed are discussed by Osman.[37] Their ultimate fate is unsatisfactory. He undertook to determine the value of tonsillectomy in a group of patients with unresolved acute nephritis and found that only one of eight consecutive patients was benefited.

It is of practical importance to determine to what degree the active inflammatory lesion is dependent on an extrarenal focus of infection and whether or not the course of acute nephritis can be influenced by such a focus. As may be seen from the foregoing discussion the persistence of active inflammation in the kidney appears to depend on some focus of infection, either the one which originally set the disease in motion or a subsidiary extrarenal disturbance. The point to be emphasized is that treatment must be directed so as to safeguard the patient from additional infections. One requirement is that the nephritis be completely cured, if possible, before the patient is dismissed from treatment. When a patient recovers from acute nephritis the chance of a new attack is remote, but such an attack may occur. On the other hand, the person who has an unhealed renal lesion has a vulnerable kidney, and infection of the upper part of the respiratory tract, tonsillitis or exposure to cold may provoke a relapse.

Our observations have led us to conclude that many persons in whom chronic nephritis develops even years after an acute attack have had a persistent continuous inflammation in the kidney. The course during the years of transition may be characterized by periods of exacerbation due to repeated attacks of infection in the upper part of the respiratory tract and by remissions, which often occur in the summer, when such infections are not prevalent. We believe that by the careful study of our patients in the intermediate period we have been able to show that this is the case.

TREATMENT

The better understanding of the significance of milder grades of acute nephritis has been reflected in more effective treatment. The onset of acute nephritis may be abrupt and the course stormy, terminating either fatally or favorably in a few weeks' time, or it may be insidious and follow a long slow course. Consequently therapeutic measures vary. It must be remembered that, however mild the attack, every patient with an acute renal inflammation is a candidate for chronic nephritis, and every effort must be bent toward the complete healing of the renal lesion. The treatment used in the classic case of acute glomerulonephritis with profound renal insufficiency is well known, while the problem of the patient with a milder grade of acute nephritis and of the person in the so-called transitional period is less well understood. This problem will be discussed briefly.

The fundamental principle in treatment is to obtain as complete a rest for the inflamed kidney as possible. Therefore the patient should be put to bed and kept there until the disease has healed or become chronic. If albumin, red blood cells and casts persist in the urine after three months and other evidences of inflammation, such as hypertension, reduced urea clearance, impaired concentration ability or rapid sedimentation rate, are present, it may be assumed that chronic nephritis has developed and further rest in bed will be of no avail.

The removal of foci of infection is useful and sometimes an immediate therapeutic necessity. Diseased tonsils or sinuses, apical abscesses and foci of infection anywhere should be treated to prevent further irritation. There is a considerable difference of opinion as to the best time to remove foci of infection. We believe that this depends on the severity of the nephritis. Surgical procedures are unwise during the early stages of acute nephritis if there is evidence of renal insufficiency, because there is danger of aggravating the condition. When the severity of the initial stage is over, operative procedures may be used most advantageously.

29. Horder, Thomas: Nephritis: New Ideas and Old Facts, Practitioner **126**: 289 (March) 1931.
30. Emerson, C. P.: Acute Element in Chronic Nephropathies, J. A. M. A. **77**: 745 (Sept. 3) 1921.
31. Mosenthal, H. O.: The Diagnosis and Treatment of Variations in Blood Pressure and Nephritis, Oxford Monograph on Diagnosis and Treatment No. 7, New York, Oxford University Press, 1935, p. 217.
32. Roper, F. A.: The Modern View of Nephritis and Its Treatment, Clin. J. **65**: 251 (Sept.) 1936.
33. Boyd, William: A Textbook of Pathology, Philadelphia, Lea & Febiger, 1934, p. 613.
34. Elwyn, Herman: Nephritis, New York, Macmillan Company, 1926, p. 142.
35. Platt, R.: Effect of Removal of Septic Foci on the Course of Nephritis, Quart. J. Med. **1**: 499 (Oct.) 1932.
36. Alport, A. C.: Focal Sepsis as a Cause of Nephritis, Lancet **1**: 1247 (June 11) 1932.
37. Osman, A. A.: Studies in Bright's Disease: The Removal of Septic Foci in the Upper Respiratory Tract in Cases of Unresolved Acute Nephritis, Guy's Hosp. Rep. **83**: 507 (Oct.) 1933.

Keutman and McCann [38] have shown that a high protein diet does not retard recovery from acute glomerulonephritis. However, it is not necessary to give a patient more than a minimal amount of protein, from 0.6 to 0.8 Gm. per kilogram of body weight, during the acute stage. Since the course of the disease and the duration of the acute phase are usually short, the intake of protein and calories may be disregarded for several days. Such observers as Volhard,[2] Fishberg [2] and Stone [39] have said that the rigid restriction of salt, food (especially proteins) and fluids (except from 400 to 600 cc. of fruit juices) is advisable for three or four days. After this period the quantity of fluid and food is gradually increased as required.

The amount of fluid that should be given to a patient with acute nephritis varies according to the degree of renal insufficiency. When the kidney is unable to secrete urine there is little object in giving fluid, yet some authorities believe that large quantities of fluid promote diuresis and eliminate toxins. The following factors should provide guidance for the administration of fluids. If there is oliguria or anuria with a rising level of nonprotein nitrogen, sufficient fluids should be given by mouth or by vein to promote diuresis if possible. Since the output of the toxic substances is dependent to a large degree on the secretion of urine, diuresis is desired. If there are hypertension and edema of the brain with increased pressure of the cerebral spinal fluid or evidence of myocardial weakness, fluids must not be forced, for they may aggravate these complications. The presence of edema is not a serious matter and should not be the deciding factor for or against the administration of fluid. The kind of fluids to be given must be decided to suit the individual case. If there has been vomiting, dehydration, oliguria or anuria, 10 per cent dextrose solution with physiologic solution of sodium chloride is necessary in order to maintain the electrolyte pattern of the tissue fluids. If diuresis is all that is aimed at, dextrose solution may be given daily. When there is edema of the brain with increased pressure of the cerebral spinal fluid and threatening convulsions, from 100 to 200 cc. of 50 per cent sucrose or dextrose solution given intravenously may be effective in reducing the pressure of the cerebral spinal fluid.

Since anemia is often a problem met with in cases of acute nephritis, large doses of iron and ammonium citrate three or four times a day are a favorite prescription. Efforts should be made to build up the patient's resistance. Proper amounts of food rich in vitamins may be helpful. It is believed by some observers that vitamins A and D especially are valuable in protecting the patient from further infections. Diuretics are not well borne in any phase of acute nephritis, and it is unwise to use them unless there is edema of cardiac origin; in this case digitalis, theobromine or small doses of theobromine with sodium salicylate may be effective.

SUMMARY

1. Numerous diseases precede acute nephritis and may have an etiologic role, and there is a lack of correspondence between the seriousness of the antecedent disease and the severity, duration and termination of the nephritis.

2. The classic textbook picture of acute nephritis is often lacking, and mild forms occur which are characterized by the urinary syndrome alone. Such mild forms are frequently overlooked, and evidence of renal damage is not observed until the disease has progressed into the chronic stage and renal insufficiency has set in.

3. If success in the treatment of acute nephritis is to be achieved, prompt recognition of the early and mild types is of the first importance. After the manifest symptoms of acute nephritis have subsided there is a period called the transitional stage, in which the renal lesion may heal completely or the disease may progress into the subacute or chronic form. It is necessary to determine whether or not healing has occurred. No one test will give this information, and a combination of diagnostic aids should be employed.

536 West Wisconsin Avenue.

38. Keutman, E. H., and McCann, W. S.: Dietary Protein in Hemorrhagic Bright's Disease: I. Effects upon the Course of the Disease with Special Reference to Hematuria and Renal Function, J. Clin. Investigation **11**: 973 (Sept.) 1932.

39. Stone, W. J.: Bright's Disease and Arterial Hypertension, Philadelphia, W. B. Saunders Company, 1937.

ABSTRACT OF DISCUSSION

DR. THOMAS ADDIS, San Francisco: The observation by Drs. Murphy and Rastetter in Milwaukee that half of their patients completely recover after passing through the initial stage of glomerular nephritis is in exact agreement with our experience in San Francisco. That is important because disagreement on this point has raised the question as to whether there may not be geographic differences in this disease analogous to the differences in the behavior of rheumatic disease on the Atlantic and Pacific Coasts. It is known now that there is at least no evidence of difference between Midwest and Far West. But neither Milwaukee nor San Francisco can tell how many of all the people who have glomerular nephritis recover. Everywhere an undetermined proportion of these people, particularly those with mild forms of the disease, escape detection and are seen by nobody. I do not believe that the disease is maintained by foci of infection or that transient generalized toxic states induced by bacterial or virus infections are often determining factors in the outcome. In this disease the end is determined by the beginning and that is why I agree with Drs. Murphy and Rastetter that the treatment of the initial stage is all important. If we follow the traditional methods we sweat, purge and starve these patients and interfere with their natural desires with respect to water by giving them either more or less than they want. But that tradition is already passing and it has begun to be recognized that the only rational therapeutics is to put the patient under conditions that induce a state of relative rest for the kidney. One thinks of the blue swollen kidneys with a circulation impeded by endothelial glomerular proliferation and inflammatory stasis; the patient must have mechanical rest and we put him to bed. But beyond that one judges, by analogy, that during that first crucial week or two the greatest possible decrease in the specific work of the kidney is needed. That means a minimal nitrogen excretion and that can be obtained only by a diet adequate in calories but with as little protein as possible. Drs. Murphy and Rastetter will, I am sure, agree that there is something even more important than the treatment of the initial stage. There is a real hope of prevention because in this disease there are a number of factors all essential for the initiation of the process. It is not only the streptococcus plus some constitutional susceptibility, for I have now seen four pairs of identical twins, that is to say, people with identical constitutional susceptibilities and after streptococcic infections one of each pair comes down with glomerular nephritis, the other escaping. Is there some immunologic peculiarity without which no scarlet fever patient will have nephritis?

DR. FRANCIS D. MURPHY, Milwaukee: I was happy to have my ideas confirmed by Dr. Addis, who has paid so much attention to this type of problem. I believe that, as Dr. Addis pointed out, when the patient is in the chronic stage of nephritis, so little can be done in a general way that the time to treat these patients vigorously is in the earlier stages when a great deal can be done to eradicate the inflammatory lesion entirely.

UTERINE MYOMECTOMY

ANALYSIS OF INDICATIONS AND RESULTS IN 523 CASES

VIRGIL S. COUNSELLER, M.D.
AND
ROBERT E. BEDARD, M.D.
Fellow in Surgery, the Mayo Foundation
ROCHESTER, MINN.

In a Hunterian lecture delivered before the Royal College of Surgeons of England, Victor Bonney [1] said: "Since cure without deformity or loss of function must ever be surgery's highest ideal the general proposition that myomectomy is a greater surgical achievement than hysterectomy is incontestable." This statement is particularly true when dealing with myomas during the child-bearing period, whatever this period may be. This designated time is arbitrarily set by some gynecologists as terminating about at the age of 40 years but, obviously, the function exists until after the menopause. The psychologic effect produced by the loss of the power to conceive is too frequently disregarded in the management of uterine myomas. It is, of course, much easier to perform a subtotal hysterectomy but the technical difficulties of myomectomy are minimized by good results obtained among young women to whom the procedure is applicable. The decision as to when it is applicable is the individual responsibility of the surgeon, who must be guided by the age, number of tumors present, the patient's desire for subsequent children, associated pathologic conditions of the adnexa, the possibility of recurrences and the ability of maintaining a serviceable organ.

Myomectomy as a surgical procedure had its origin first in the removal of single pedunculated myomas, and later it became customary to enucleate single myomas from the body of the uterus itself. The good results which attended these procedures have been extended in recent decades by such men as W. J. Mayo,[2] Clark and Norris,[3] Bonney, Giles,[4] Labey,[5] Murray [6] and others, to the point where multiple myomas of all sizes and positions have been removed with conservation of the uterus as a functioning organ. Myomectomy is not regarded favorably by the profession in general except by those men who are not only technically adept in pelvic surgery but also have in mind the effects on the organism of the loss of the physiologic functions of the reproductive mechanism.

The risk of the operation is looked on by some as excessive in comparison with hysterectomy but, from reports in the literature made by capable gynecologists, the risk is essentially the same as for subtotal hysterectomy; namely, from 1 to 2 per cent. The convalescence, especially if multiple tumors are removed, may be more febrile than that following hysterectomy; the febrile reaction ensues from the absorption of blood from the uterus or from the pelvic peritoneum, which is in no way detrimental. Convalescence following removal of pedunculated tumors is virtually uneventful.

The percentage of recurrence is a variable factor and depends on the completeness of removal of all small seedling tumors. Some are of the opinion that it is not necessary, in the presence of multiple large and small tumors, to remove all of the smallest ones. Nevertheless, if meticulous care is exercised in removing the smallest leiomyoma, the incidence of recurrence should be proportionally reduced. However, when operating in pregnancy for the removal of an obstructing or degenerating myoma, it would not be prudent to remove other insignificant myomas at that particular time; also, as in our own cases, myomectomy occasionally is performed as a secondary procedure incident to an appendectomy or ruptured ectopic pregnancy, excision of endometrial implants, presacral resection and ovarian cysts, in which cases smaller tumors within the myometrium might be overlooked.

We wish to present our observations in 523 cases in which abdominal myomectomies for uterine myomas were performed at the Mayo Clinic between 1925 and 1934 inclusive. During this decade about 3,400 hysterectomies were performed for leiomyoma of the uterus, which gives a ratio of about six hysterectomies to each myomectomy; or, myomectomy was performed in about 14 per cent of the total number of cases in which operation was performed for leiomyomas during this period.

TABLE 1.—*Age Distribution in Myomectomy (523 Cases), 1925-1934*

Age, Years	Number	Per Cent
10-19	2	0.4
20-29	76	14.5
30-39	331	63.3
40-49	76	14.5
50-59	22	4.2
60-69	16	3.1
Mean age	36.7 years	
Oldest	69 years	
Youngest	18 years	

It is often stated in discussions of this subject that the late thirties should be the upper limit for patients who are to be subjected to myomectomy. Therefore, for purposes of clarity we have divided our series into groups: those less than 40 years of age and those 40 years of age or older. Of the 523 patients, 409, or 78 per cent, were less than 40 years of age and 114, or 22 per cent, were 40 years of age or older; of the latter group, the presence of leiomyomas was of secondary importance to other indications for operation in 55 per cent of cases.

AGE INCIDENCE

The largest number of myomectomies performed was 330, or 63.3 per cent, in the fourth decade. The oldest patient was 69 years of age and the youngest 18. The average age was 36.7 years. Only thirty-eight patients, or 7.3 per cent, were actually beyond the reproductive period (table 1).

MENSTRUAL HISTORY

The menstrual disturbances conform to the same general rule among those patients treated by myomectomy as for leiomyomas in general. We found that 199 patients, or 38 per cent, had normal menstrual periods. This was particularly true among those patients who had only large pedunculated tumors and in cases in which the myomas were small and usually of secondary importance. Two hundred and sixty-nine patients, or 51.4 per cent, had abnormal periods; that is, 137, or

From the Division of Surgery, the Mayo Clinic.
Read before the Section on Obstetrics and Gynecology at the Eighty-Ninth Annual Session of the American Medical Association, San Francisco, June 16, 1938.

1. Bonney, Victor: The Technic and Results of Myomectomy, Lancet **1**:171-177 (Jan. 24) 1931.
2. Mayo, W. J.: Myomas of the Uterus, with Special Reference to Myomectomy, J. A. M. A. **68**:887-890 (March 24) 1917.
3. Clark, J. G., and Norris, C. C.: Conservative Surgery of the Pelvic Organs in Cases of Pelvic Peritonitis and of Uterine Myomata, with the Review of the Immediate and After Results of 299 Cases, Surg., Gynec. & Obst. **11**:398-413 (Oct.) 1910.
4. Giles, A. E.: Indications for and Results of Myomectomy for Uterine Fibroids, Proc. Roy. Soc. Med. Part 3, **16**:13-21 (Oct. 3) 1922.
5. Labey, M., quoted by Goulliaud, M.
6. Murray, H. L.: Myomectomy: A Record of 154 Consecutive Cases, Tr. Edinburgh Obst. Soc. **37**:73-100, 1930.

50.9 per cent, had chiefly menorrhagia and/or metrorrhagia, whereas in 128 cases, or 47.6 per cent, the chief disturbance was dysmenorrhea (table 2). This incidence of pain is somewhat surprising and might lead to the diagnosis of adenomyoma or endometriosis.

DESCRIPTION OF TUMOR

The tumors were studied with regard to whether they were single or multiple and with regard to size. We divided them into those 4 cm. or less in diameter and those over 4 cm. in diameter. The importance of the tumor was then noted; that is, whether it was of primary or of secondary consideration.

The occurrence of leiomyomas is almost evenly divided between single and multiple tumors. It is obvious from this that the presence of a single leiomyoma was not the sole indication for myomectomy.

Small tumors are somewhat in excess but 227, or 43.4 per cent, were classed as large tumors or exceeded 4 cm. in diameter (table 3). The excess of tumors less than 4 cm. in diameter is explained on the basis of the primary or secondary importance of the tumor; that is, many of the small tumors whether single or multiple were removed as a secondary procedure in conjunction with other pelvic operations. There were, therefore, 229, or 43.8 per cent, classed as of secondary importance and, in the majority of these, the tumors were less than 4 cm. in diameter. The largest myoma measured 27 cm. and the smallest 2 mm., and the largest number of myomectomies in any one case was fifteen.

One of us (Counseller) has called attention to the importance of the situation of the myoma in relation to the uterus in selecting the type of surgical treatment in the management of uterine myomas. This is of particular importance in the consideration of myomectomy. In this connection, myomectomy holds a favorable position, because the majority of myomas are situated in the body of the uterus, usually on the anterior or the posterior wall. They are usually designated as subserous, interstitial or submucous according to whether they are under the peritoneum, embedded in the wall of the uterus or under the mucosa. It was previously considered a greater risk to penetrate the uterine cavity than not to do so in performing a myomectomy but,

TABLE 2.—*Menstrual History in Myomectomy (523 Cases), 1925-1934*

Group	Number	Per Cent
Normal	199	38.0
Abnormal	269	51.4
Menorrhagia and/or metrorrhagia, chiefly	137	26.9
Dysmenorrhea	128	47.6
Irregularity	4	1.5
Menopause	39	7.5
Not stated	16	3.1

if myomas are situated in the submucous position, it is frequently of distinct advantage to be able to control bleeding and to locate additional small tumors similarly placed which, if not removed, might reasonably produce an early recurrence of symptoms. Opening the uterine cavity in performing an abdominal myomectomy is distinctly contraindicated wherever there is a pedunculated submucous leiomyoma which has become partially extruded through the cervix because, in the majority of such cases, there is an associated endometritis.

It was not possible to give the specific site with respect to the uterus in this series because this information was not contained in a sufficient number of the operative records to be of value; however, 473, or 90.4 per cent, were situated in the fundus exclusive of thirty-two, or 6.1 per cent, which were situated in the horn of the uterus and a few each in the broad and round ligaments and in the cervix. A great many of the tumors were on the anterior wall, interfering with distention of the bladder, but in only eleven instances, or 2.2 per cent, was there any evidence of important vesical dysfunction.

In this connection, it is important to state that when a myoma is encountered on the anterior surface of the uterus and the wall of the bladder is attached to the

TABLE 3.—*The Tumors in Myomectomy (523 Cases), 1925-1934*

Group	Total Number	Total Per Cent
Number of tumors		
Single	268	51.2
Multiple	255	48.8
Size of tumors		
4 cm. or less	280	53.5
Over 4 cm.	227	43.4
Not stated	16	3.1
Importance of tumor		
Primary	294	56.2
Secondary	229	43.8

myoma, it is occasionally better operative technic to resect that segment of the bladder which is attached to the tumor rather than produce any excessive interference with the blood supply of that segment of the bladder because, when the blood supply of any segment of the bladder is disturbed, a secondary and persistent interstitial cystitis may be a complicating sequela.

When myomas are situated in a horn of the uterus, as obtained in 6.1 per cent of our cases, the function of the fallopian tube on that side may be destroyed or at least seriously interfered with. In cases in which this situation is obvious, it is usually safer to remove the tube and, as a protective measure, to utilize the round ligament in covering the defect in the uterus. Also myomas which extend from the lateral wall toward the broad ligaments are usually pedunculated and their removal is usually complicated by the position of the ureter and the uterine vessels. In enucleating such tumors we have found it of distinct advantage to open the anterior sheath of the broad ligament near the pedicle of the tumor and visualize these structures. The ureter usually will be situated posteriorly and can be seen as the tumor is rotated anteriorly, and then the ureter can be carefully protected. If the ureter is anterior, it can be mobilized and retracted out of harm's way with gauze tape.

When the uterine arteries and veins are intimately attached to the pedicle, these structures can be safely ligated on that side without any subsequent complications, provided the blood supply on the opposite side is intact.

If tumors are situated in the posterior wall of the uterus and are not pedunculated, it is much wiser, as Murray points out, to enucleate these tumors through an incision in the anterior wall directly through the uterine cavity so as to obviate the necessity of an incision on the posterior wall to which the bowel might subsequently become adherent and produce intestinal obstruction. Through such a maneuver, the myometrium is more favorably conserved. It should be stated, therefore, for the same reason that whenever myomectomy is performed it should be through the anterior surface of the uterus or through the anterior sheath of the broad ligament. In some situations this is not feasible, and then it is extremely important to have the surface as

smooth as possible. We feel, however, that the incidence of intestinal obstruction following myomectomy has been overestimated and is of less importance if the omentum is utilized to the best advantage at the conclusion of the operation.

ASSOCIATED OVARIAN DISEASE

In less than half of all the cases, 47.4 per cent, there was positive evidence of ovarian disease other than malignancy. In 19.7 per cent all evidence of ovarian disease was lacking, whereas in 32.9 per cent the records did not contain any statement to specify the presence or absence of it; but this is presumptive evidence that ovarian disease did not exist, at least to the extent of requiring treatment. If one permits such an interpretation concerning the latter group, 52.6 per cent of the cases were not associated with ovarian disease. This would conform to the usually accepted fact that ovarian disease is associated with uterine myomas in approximately 50 per cent of the cases. If myomectomy is the procedure of choice, conservative operations on the adnexa are decidedly indicated especially if the two adnexa are similarly involved. A unilateral salpingo-oophorectomy is often necessary but still is considered a conservative operation. We have encountered patients who had repeated pregnancies occur subsequent to the removal of one fallopian tube and the opposite ovary. The same experience has followed the removal of one tube and bilateral resection of the ovaries, in which case only a small segment of normal ovarian tissue remained on each side. In this series, conservative operations were performed on the adnexa in 206 cases; in 300 cases, operation was not required. Also there is an occasional instance in which there is a large degenerating or rapidly growing myoma in an atrophic uterus, in which case it is safer to remove the myoma than to submit the patient to hysterectomy. Such is encountered among elderly patients who are poor surgical risks. The time element in the operation is an important factor. There were three such instances in this series in which radical removal of both adnexa was performed for associated disease among patients more than 40 years of age, in which cases myomectomy was the primary procedure. Furthermore, there were fourteen instances in which myomectomy was done as a secondary procedure; both adnexa had been removed as the primary operation. Six of these patients were less than 40 years of age and eight were more than 40 years of age. In each case the general condition contra-indicated radical hysterectomy.

TABLE 4.—*Patients Pregnant at Myomectomy (Twenty-Two * Among 523 Operated on), 1925-1934*

	Number	Per Cent
Miscarriage	7	31.8
No miscarriage	15	68.2
Normal birth	11	73.2
Cesarean section at term	1	6.7
Stillbirth at term	1	6.7
Forceps at term (hydrocephalic child)	1	6.7
Premature birth	1	6.7
Total	22	100

* This does not include seven cases of ectopic pregnancy and four cases in which cesarean section was performed coincidentally with myomectomy, which would bring the total to thirty-three.

MYOMECTOMY DURING PREGNANCY

Myomas associated with pregnancy do not necessarily call for surgical treatment. It is the belief of some (Bonney, Danforth,[7] Lynch,[8] Polak[9] and Giles) that myomectomy is inadvisable in pregnancy unless the case is very exceptional. These exceptional cases consist of red degeneration or necrobiosis, rapid increase of size of the myomas, and situation of the tumor so as almost certainly to obstruct delivery. Some authors feel that, even in the face of some of these indications, it is better to attempt to carry the patient to term and to treat emergencies as they arise.

We have, in our series, a total of thirty-three cases in which myomectomy was performed in pregnancy.

TABLE 5.—*Recurrence of Leiomyomas in 523 Cases After Myomectomy, 1925-1934*

Group	Total		Age: Less than 40		Age: 40 and Over	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Negative	244	47.2	190	46.9	54	48.2
Positive—proved	26	5.0	25	6.2	1	0.9
Positive—not proved	85	16.5	76	18.8	9	8.0
Unknown	162	31.3	114	28.1	48	42.9
Total	517*	100	405	100	112	100

* Excludes six postoperative deaths.

Seven of these were ectopic pregnancies, and in four cesarean section was performed coincidentally with myomectomy. By excluding these eleven cases there remain twenty-two cases of intra-uterine pregnancy in which myomectomy was performed. In three instances a very early pregnancy was not known to exist. In thirteen there were serious symptoms of degeneration or necrosis, and in three the tumor and uterus were impacted in the pelvis.

Seven, or 31.8 per cent, of the patients had a miscarriage postoperatively. Fifteen, or 68.2 per cent, did not have a miscarriage. Among these fifteen eleven, or 73.2 per cent, had normal births. There was one case each of cesarean section at term, stillbirth at term, forceps delivery and premature birth, an incidence of 6.7 per cent each (table 4). The figures given by most authors are in accordance with this. Brindeau[10] found that 76 per cent did not have a miscarriage and Gemmell[11] stated that 80 per cent had normal children.

RESULTS OF MYOMECTOMY

In evaluating the results of myomectomy it is necessary to consider whether or not the individual has been relieved of the condition for which she sought treatment, the question of recurrence and subsequent surgical procedures that are necessary to effect relief, and the effect of the disease and treatment on subsequent fertility.

These results were computed three or more years after operation. Among the 523 patients there were six deaths, or 1.2 per cent. Of the remaining 517 patients 244, or 47.2 per cent, were cured. There were 111 cases in which recurrences developed. In twenty-six of these cases, recurrence of leiomyomas was proved at subsequent operation here or elsewhere; in eighty-five the diagnosis of recurrent leiomyomas was made after pelvic examination here or elsewhere. The results could not be ascertained in 162, or 31.3 per cent.

7. Danforth, W. C.: The Treatment of Fibroids, Am. J. Obst. & Gynec. **28**: 409-420 (Sept.) 1934.
8. Lynch, F. W.: Uterine Fibromyoma: Review of 683 Cases, J. A. M. A. **94**: 156-162 (Jan. 18) 1930.
9. Polak, J. O.: The Influence of Fibroids on Pregnancy and Labor, Surg., Gynec. & Obst. **46**: 21-29 (Jan.) 1928.
10. Brindeau, A.: La myomectomie dans ses rapports avec la grossesse, Gynéc. et obst. **20**: 255-271 (Oct.) 1929.
11. Gemmell, A. A.: Abdominal Myomectomy, J. Obst. & Gynaec. Brit. Emp. **43**: 715-748 (Aug.) 1936.

Of these 517 patients 405 were less than 40 years of age and 112 were 40 years of age or older. Of the 405 who were less than 40 years of age, 25 per cent gave evidence of recurrence of tumors, whereas in only 8.9 per cent of those older than 40 years of age was there evidence of recurrence (table 5). The incidence of recurrence in this series, which is more than 20 per cent, is exceptionally high in comparison with the figures given by Gemmell, who summarized the world literature in this connection and found that the incidence of recurrence varied from 0 to 14.28 per cent whereas the probable average is approximately 4 to 8 per cent.

TABLE 6.—*Treatment Subsequent to Myomectomy (523 Cases), 1925-1934*

Treatment	Number	Per Cent
Subsequent pelvic surgery	58	11.1
Hysterectomy	43	74.2
Other surgery	15	25.8
Other treatment for bleeding	39	7.5
Radium	9	23.1
Roentgen	6	15.4
Miscellaneous	24	61.5
No subsequent treatment	243	46.2
Deaths postoperatively	6	1.2
No information	177	33.8
Total	523	100

Our incidence of recurrence is amply explained by the fact that in 229 cases, or 43.8 per cent, myomectomy was a secondary procedure and, therefore, complete removal of all tiny leiomyomas which would be necessary to reduce the incidence of recurrence was not performed in every instance.

Not all patients who had evidence of recurrence submitted themselves for subsequent treatment. However, ninety-seven of this group of 111 had some form of subsequent treatment, as shown in table 6. Forty-three were subjected to subsequent hysterectomy, although in only twenty-one was it positively known that myomas were the primary reason for hysterectomy. Nine of the recurring myomas were treated by radium therapy and six by roentgen therapy. In twenty-four cases, subsequent medical treatment of one type or another was administered for menstrual disturbances.

FERTILITY

The incidence of fertility was determined on all patients with the exception of eight in whom the information was not available prior to operation. There were 135 who were unmarried, whereas 388 were married. Of the 388 married women 238, or 61.3 per cent, had been pregnant. Of the 238 women who had been pregnant there were 152 who gave birth to living infants, or 63.9 per cent. Sixty-four, or 26.9 per cent, had experienced only miscarriages, which is presumptive evidence that the leiomyomas were an etiologic factor in the miscarriages. Twenty-two, or 9.2 per cent, were pregnant for the first time when the myomectomy was performed (table 7). There were no pregnancies in 142 cases, an incidence of sterility of 36.6 per cent of the total married group.

Subsequent to myomectomy, sixty-eight of the 409 patients less than 40 years of age at the time of myomectomy became pregnant and bore a total of eighty-four babies, four of which were born by cesarean section and eighty by natural birth.

This figure is further enhanced by the following observations: Six patients were known to be dead at the time of this study, thirty-one were sterilized at operation or within three years after operation; ninety-five were still unmarried; eighty-one of those married were not heard from with respect to subsequent pregnancy. The postoperative fertility is, therefore, more reasonably calculated on the basis of 196 patients less than 40 years of age, for whom pregnancy could be expected. Of these, sixty-eight became pregnant, an incidence of 34.7 per cent. Finally, if it is assumed that the eighty-one patients whom we could not trace as to pregnancy actually did not become pregnant, the incidence would be reduced to 24.5 per cent, which parallels that given by other authors. Murray quoted the figure 27.3 per cent, Riley [12] 18 per cent, Gemmell 27 per cent and Goulliaud [13] 25 per cent less than 40 years of age. Bonney, however, stated that 39 per cent of patients within the child-bearing age may be expected to conceive following myomectomy.

TABLE 7.—*Fertility in 523 Cases in Which Myomectomy was Performed, 1925-1934*

Group	Number	Per Cent
Unmarried	135	25.8
Married	388	74.2
Pregnancy	238	61.3
Living births	152	63.9
Miscarriages only	64	26.9
First pregnancy at time of operation	22	9.2
No pregnancy	142	36.6
No information	8	2.1

SUMMARY AND CONCLUSIONS

Observations in 523 cases in which abdominal myomectomy was performed for uterine myomas, between 1925 and 1934 inclusive, revealed a mortality of 1.14 per cent.

During this period about 3,400 hysterectomies were performed for leiomyomas, giving a ratio of about six hysterectomies to each myomectomy, or about 14 per cent.

There were 294 patients who experienced myomectomy as the primary operation and 229 who were subjected to myomectomy as a secondary procedure.

The operations were performed in each instance as conservative methods to maintain as far as possible the reproductive and menstrual functions. In a few instances, among patients beyond the reproductive period, the adnexa were removed, myomectomy being performed as a secondary procedure; 63.3 per cent of the patients were in the fourth decade of life and the average age of all patients was 36.7 years.

The menstrual periods may be normal among patients who are candidates for myomectomy. In this series the periods were normal in 38 per cent of the cases. Dysmenorrhea was a prominent symptom in 47.4 per cent of the patients who had abnormal menstrual periods.

The situation of the tumor with respect to the uterus is an important factor in performing myomectomy. That is, as far as possible, all myomas should be enucleated through the anterior surface of the uterus or through the anterior leaf of the broad ligament so as to minimize the risk of later intestinal obstruction.

Ovarian disease was associated in approximately the same number of cases as that seen in performing hysterectomy for leiomyomas in general. In this series it was 47.4 per cent.

Myomectomy in pregnancy is indicated only in exceptional instances. There were twenty-two cases of intrauterine pregnancy in which myomectomy was performed. Of these, 31.8 per cent of the patients had a miscarriage

12. Riley, F. R.: Myomectomy in Uterine Fibroids, New Zealand M. J. **27**: 68-77 (April) 1928.

13. Goulliaud, M.: Dix-huit cas de grossesse après la myomectomie abdominale, Bull. et mém. Soc. nat. de chir. **54**: 691-699 (May 9) 1928.

postoperatively. Of those who did not have a miscarriage, 73.2 per cent had normal births; there was only one case in which cesarean section was performed. Myomectomy, therefore, is not to be regarded as too important a factor in subsequent delivery.

The recurrence of leiomyomas in this series was approximately 20 per cent, which is somewhat higher than that currently reported but is accounted for by the fact that 229 of the myomectomies were secondary procedures. It is of importance that 25 per cent of those less than 40 years of age were known to have recurrences, as contrasted with 8.9 per cent more than 40 years of age. Of the group of 111 who had recurrences, only twenty-six required subsequent surgical treatment.

The incidence of fertility was determined for all patients with the exception of eight, or 2.1 per cent, regarding whom the information was not available prior to operation. This incidence was 61.3 per cent, but 26.9 per cent of the fertile patients had experienced only miscarriages.

Subsequent to myomectomy, sixty-eight of the 409 patients who were less than 40 years of age at the time that myomectomy was performed became pregnant and bore a total of eighty-four babies. The postoperative fertility was accurately determined for 196 patients less than 40 years of age among whom pregnancy could reasonably be studied, which gives an incidence of 34.7 per cent postoperative fertility. In the presence of a postoperative incidence of fertility of 34.7 per cent, myomectomy should certainly be regarded as a favorable procedure during the reproductive period, especially when the mortality is not higher than that associated with radical procedures.

ABSTRACT OF DISCUSSION

DR. FRANK W. LYNCH, San Francisco: There is no doubt that myomectomy is not a popular operation and, from the standpoint of modern surgery, that its unpopularity is undeserved. The literature of twenty-five or thirty years ago showed a surgical mortality rate at least twice as much as for hysterectomy. The feeling that the mortality rates are the same lingers still in the minds of many who practice surgery. There are definite reasons why myomectomy was a more hazardous procedure than supravaginal hysterectomy. Uterine muscle that surrounds a growing fibroid hypertrophies just as a pregnant uterus does and involutes later in the same manner, even though in lesser degree. Such tissue does not heal as rapidly as the resting type. The blood vessels nourishing the fibroid are also thin walled, and bleeding is not readily controlled except with some mass ligation. Yet these obstacles to proper wound healing can be readily overcome by proper technic. In the past, the uterine incision was usually closed with through and through sutures, which were often tied too tight, as A. J. Ochsner showed. Nor was there any attempt at proper peritonization. Rough knots of coarse silk or catgut invited dense adhesions, and some degree of intestinal obstruction was not unusual if the case was observed long. With a modern operative technic, all bleeding points are ligated before the uterine incision is closed in layers. Opening the uterine cavity is a matter of little importance if there is proper technic, as the authors have shown. Proper peritonization is vital to a successful operation. There should be no rows of knots of interrupted sutures visible on the uterine incision. A proper closure can be made with only one knot which shows. Aids to peritonization are grafts of omentum or proper utilization of the peritoneal surfaces of the round ligaments pulled back as a Webster cover. With such a technic the patient has little risk. My experience agrees closely with that of the authors, although my series is much smaller. In a series of 1,045 fibroids treated surgically, 42 per cent had supravaginal hysterectomies, 20 per cent panhysterectomies and 18 per cent myomectomies. The surgical mortality rate for the 855 hysterectomies was 0.95 per cent and for the 190 myomectomies it was 0.5 per cent. Forty-one per cent of my patients had tumors larger than 4 cm. Other fibroids have developed requiring subsequent operation in a few. All these women originally had many small tumors. There are no known recurrences in patients whose single tumor was large and deeply embedded in the uterine muscle.

PUBLIC HEALTH ASPECTS OF INDUSTRIAL HYGIENE

R. R. SAYERS, M.D.
AND
J. J. BLOOMFIELD
Senior Surgeon and Sanitary Engineer, Respectively, United States Public Health Service
WASHINGTON, D. C.

"In recent years," wrote Sir George Newman,[1] "we have learned that public health is not only a matter of the postponing of mortality and the prevention of sickness, but of the positive side of health—the increase of vitality, capacity, and efficiency of the human body. Our aim is not only to oppose diseases but to advance and develop physical fitness and well being. To secure this end, we must have regard to the whole life of man—his heredity and upbringing, his work and rest, his food, his habits, his environment. We must pay attention not only to his actual ailments and diseases, but to the conditions making for a maximum degree of personal health. Thus it comes about that a new relation is found to exist between occupation and health. In a word, the health of the industrial worker forms an integral and inseparable part of the health of the community."

This broad concept of industrial hygiene was enunciated nearly two decades ago and like all fundamental statements is applicable today. Yet, if stock is taken of what has been accomplished in this country during the past twenty years and especially of present practices in this field of public health, it is realized that emphasis has been placed on the control of industrial accidents and occupational diseases. It is not intended to underestimate the importance of accidents and occupational diseases but rather to call attention to the opportunity offered and at the same time to provide assistance to the groups served in the solution of other health problems which are equally, if not more, important. Since industrial health is so closely interwoven with community health, each component part of a broader program is certain to support the other. An analysis of the health problems affecting all wage earners and the present day activities in the field of industrial hygiene will serve to indicate more clearly what may and should be accomplished in the immediate future.

SCOPE OF THE PROBLEM

Industrial hygiene is the science of the preservation of the health of workers. It therefore involves primarily a program for conservation of health and prevention of accidents and occupational disease. Such a program necessarily extends beyond prevention of accidents and occupational diseases; it includes also the broad subject of the health of the worker. It is obvious that some of

Read before the Section on Preventive and Industrial Medicine and Public Health at the Eighty-Ninth Annual Session of the American Medical Association, San Francisco, June 15, 1938.

1. Newman, George: Part of Introduction to Collis, E. L., and Greenwood, Major: The Health of the Industrial Worker, Philadelphia, P. Blakiston's Son & Co., 1921.

the problems arise from the nature of the industrial environment itself; namely, the control of poisons, dusts, excessive temperature and humidity, defective lighting, noise, overcrowding and general plant sanitation. Some of them obviously involve such factors as hours of work, fatigue, communicable diseases in the factory, mental health and personal hygiene.

In the past, industrial hygienists have concentrated their efforts in the main on a rather limited portion of the industrial population; namely, the fifteen million workers employed in manufacturing and in mechanical and mineral industries. Although it is true that the greater number of occupational diseases develop among employees in these groups, some of the ten million employed in agriculture and the four million employed in transportation and communication and others should be considered in an industrial hygiene program, for all have health problems which are deserving of attention.

Frequently, workers in establishments hiring large groups in all classes of employment are provided some health services. However, the fact that a large number of workers are employed in small establishments which have no practical means of providing adequate attention to health calls for the cooperation of all interested in the promotion of an effective industrial health program. Of a total of more than eight million persons employed in manufacturing plants, about one half are found working in establishments with less than 250 workers. The obstacles associated with the development of a complete health service for employees in these small units are not unsurmountable if the problem is approached in a cooperative spirit. This means increased activity on the part of all professions and agencies interested in health preservation and that the plans and interests of all need to be correlated. While public health officials may assist most in the administrative and educational phases of the work, the success of their efforts—as in other fields of public health—is dependent on the close cooperation and aid of the group served and the members of organized medicine in the community.

While insufficient data have thus far prevented recognition of some health problems peculiar to wage earners, there is ample evidence to indicate that morbidity and mortality rates are higher for some groups than for all gainfully employed persons or the adult population generally. These excessive rates are especially notable for unskilled workers, for whom the death rate from all causes in certain states was found to be 100 per cent in excess of the death rate for agricultural workers. Studies conducted in specific industries have shown the incidence of such diseases as tuberculosis, pneumonia and degenerative conditions to be higher than the average for the entire industrial population. There is evidence to justify the opinion that deaths from tuberculosis can be reduced 50 per cent by health supervision of workers in occupations predisposing to the disease, by detection of minimal cases and by provision of adequate medical and institutional care in the early stages of the disease. A large amount of information testifies that in a majority of cases the disease is discovered too late in its course for the most effective treatment. It is also known that mortality and disability from pneumonia are excessive among workers exposed to extreme and sudden changes in temperature, inclement weather, toxic gases and dusts.

In view of the means by which the health of the workers can be improved, the problem is complex. First, from the layman's point of view—because the relationship between cause and effect is more readily discernible—the disability and lost time due to industrial accidents and diseases seem most important. Although great advance has been made in the prevention of industrial accidents during the past twenty years, this form of injury continues to be a major health problem. Incidentally, the industrial hygienist is usually more conscious than others of the part played by ill health as a contributory cause of many of these accidents. According to the last report of the National Safety Council,[2] there were 19,000 occupational deaths in 1937. Studies indicate also that minimum rates have not been approached, since the records for accidents in the steel companies with the best practices show a rate far lower than that for the industry as a whole.[3] Second, it is well known that certain occupations, not necessarily the so-called dangerous trades, are associated with poisoning, disease and high mortality. Third, some workers lack the physical capacity to undertake certain types of work. Fourth, absenteeism due to what may be termed general diseases affecting adults is far too high. While accidents, occupational diseases and high occupational death rates are impressive, there is no doubt that the least dramatic side of the problem—the lost time and incapacity due to illness—is a fact of most importance. Here there is a vast amount of wasted energy and life due in the main to preventable illnesses, some of which may be contributed to by the working environment. Although significant progress has been made in the control of certain communicable diseases, as is evidenced by the declining trend of the death rate in the last forty years, one must not lose sight of the fact that this saving of life has taken place chiefly in childhood and in the years of early adult life. No significant increase occurred during this period in the average years of life remaining to persons of middle and advanced age. The death rates from some important diseases of adult life have been increasing, a phenomenon understandable in the light of the fact that the principal causes of death operating in the advanced years are primarily chronic. Preliminary data from the national health survey, based on surveyed persons of all ages, show that chronic diseases, including permanent impairments, alone account for six of the ten days of incapacity from illness and accidents experienced by the average person per year, and with respect to sickness and accidents, data to be published by the Division of Industrial Hygiene show in the instance of a public utility that on the average 7.5 days were lost annually by men and 10.9 by women.[4]

All these facts have an important bearing on the industrial health problem, since an adult population is involved. The health problems peculiar to workers as a group may be effectively solved by the application of those public health methods which have operated so successfully in the control of specific illnesses affecting other units of the population. In the control of communicable diseases which affect primarily infants and school children, the administrative, educational and professional program has been designed to meet the particular needs. The school authorities, parent-teacher associations and other community groups with the medical profession have cooperated with state and local health agencies in the control of such diseases.

2. Accident Facts, preliminary 1938 edition, Chicago, National Safety Council, 1938.

3. Accident Experience in the Iron and Steel Industry to the End of 1932, Monthly Labor Review **37**: 566-581 (Sept.) 1933.

4. Preliminary Reports, the National Health Survey: Bull. 1, Sickness and Medical Care Series, U. S. Public Health Service, Washington, D. C., 1938.

Public health action may in a like manner be brought to bear on problems affecting the health of the worker, since closely associated industrial groups will provide similarly essential and highly important group contacts.

PRESENT TRENDS IN INDUSTRIAL HYGIENE

Government responsibility for safeguarding health rests chiefly with the state and local health departments. The activities of federal agencies engaged primarily in the field of industrial hygiene are established for the purpose of collecting and disseminating information, conducting field and laboratory investigations and protecting the health of federal employees. Prior to 1936 most states had concerned themselves chiefly with matters of safety, sanitation, employment of women and children and compensation of employees following disabling accidents. All but two states have workmen's compensation legislation for accidental injuries, and today twenty-one states provide compensation for one or more occupational diseases. Administratively, the states have placed enforcement of occupational disease legislation in various departments.

During the past two years the United States Public Health Service has, on request, through the Division of Industrial Hygiene, assisted in the development of this field in state and local health departments. Progress has been stimulated in part by funds allotted to the various states for public health activities by the provisions of the Social Security Act. Today there are twenty-three states and four municipal departments of health that have taken steps to provide industrial health services;[5] but it must be remembered that these units have been recently established and will not be in a position to render complete or adequate service to industry and labor and the medical profession until they have greatly increased financial support and trained personnel.

At present the industrial hygiene divisions in the states and cities are confining their work chiefly to the evaluation and control of occupational diseases in industry. Occupational diseases have for some time been receiving unusual attention. The reason for the "occupational disease" approach to industrial health problems is logical. First, the relationship between a specific occupational disease and environment is frequently tangible, and the benefits of control practice are evident. Second, the manner in which some diseases have developed in specific industries has been such as to favor dramatization, which in turn has served to make interested groups more conscious of the importance of occupational disease and the need of providing benefits for workers suffering from such illnesses, as in the case of injuries due to industrial accidents.

The thought might bear repetition here that industrial hygiene is essentially adult health maintenance among the gainfully employed and necessarily runs the entire gamut of public health for these persons. Nation-wide data to support this view are being collected and analyzed. It is hoped that there will be some basic statistics on the subject of illness and death by occupation in this country as soon as the Public Health Service has had an opportunity to analyze the results of its recent inquiry on more than a half million workers. Limited statistics for the prevalence of occupational diseases are available for a few states. In Wisconsin, where a workmen's compensation law has been in operation longer than in any other state, some recent unpublished data furnished by Dr. William M. Gafafer of this division bear examination. For the sixteen year period from 1920 to 1935, occupational diseases accounted for 2 per cent of the total cases of compensation. During 1935 this percentage increased to 2.8. During the same sixteen year period 2.8 per cent of the total costs for all injuries was due to occupational diseases, but during 1935 the corresponding percentage increased to 7.1. The compensation cases settled in 1935 represented a loss of over two million working days, and of these days lost 8 per cent were accounted for by occupational diseases. In other words, although the incidence and the costs of occupational diseases are rising, occupational diseases account for but a small percentage of the total compensation cases and costs in the state of Wisconsin. Reports from other states, for example New York, New Jersey and Ohio, show a similar trend. According to the United States Department of Labor, the total direct and indirect costs of industrial injuries in this country are approximately 5 billion dollars annually, and of this amount but a small percentage is accounted for by occupational diseases.

On the other hand, studies made by the American College of Surgeons indicate that illness causes at least fifteen times as much absenteeism as do industrial injuries.[6] For women lost time from sickness in certain companies has been found to be as much as forty times the number of days lost from work on account of industrial accidents.[7] Although we have no comparable statistics to show the costs in this country for the so-called general illnesses in the industrial population, individual studies do show that were such information available it would definitely indicate that these costs are far in excess of expenditures due to occupational disease and accidents. Data cited by the Committee on the Costs of Medical Care indicate an expenditure of approximately 10 billion dollars annually due to illness.[8]

It would seem, therefore, that if the general health of a most important and numerous group in the population is to be improved it will be necessary not only to control unhealthful conditions in the working environment but also to give consideration to such factors as proper living conditions, elimination of strain and hurry, nutrition and communicable diseases; in fact, to a general adult health program for workers. A broad industrial health program of this character to progress satisfactorily must be closely interwoven with existing public health activities.

A SUGGESTED PROGRAM

Health officials increasingly emphasize the industrial phase of public health, because any active program among industrial workers will improve the general health in the state. The following method of approach in industrial hygiene, recommended by the Public Health Service, has been undertaken by various states.

The scope and nature of the problems in the state may be established in several ways. If it was possible to obtain statistics for industrial morbidity and mortality as well as for the prevalence of occupational diseases and accidents, there would exist a basis for defining the program. However, such statistics are unavailable except for some accidents, for occupational diseases in a few states and for illness in plants having sick benefit associations. For this reason it has been suggested to

5. There are two divisions of industrial hygiene in state departments of labor.

6. Newquist, M. N.: Medical Service in Industry and Workmen's Compensation Laws, Chicago, American College of Surgeons, 1938.

7. Brundage, D. K.: An Estimate of the Monetary Value to Industry of Plant Medical and Safety Services, Pub. Health Rep. 51:1145 (Aug. 21) 1936.

8. Falk, I. S.; Rorem, C. Rufus, and Ring, Martha D.: The Costs of Medical Care, Pub. 27, Committee on the Costs of Medical Care, Chicago, University of Chicago Press, 1933.

the various states that they conduct preliminary surveys of representative samples of work places in an effort to obtain information on the potential occupational diseases and health services. The data on health services in particular should prove useful so far as the survey calls for information concerning the keeping of adequate sickness and accident records.

Once the potentialities for occupational diseases have been established by means of this preliminary survey, the industrial hygiene personnel are in a position to select industries for detailed study in an attempt to evaluate each exposure and the means of its control. When studies are completed it should be possible to make definite recommendations for the control of existing or potential health hazards.

By a cooperative program with industrial officials and local physicians, arrangements may be effected for securing reports of occupational diseases and, more important, for investigating the cases so that the cause of the disease may be determined and efforts made to prevent its recurrence. From the preliminary survey, data should be available concerning the extent to which absence due to illness is recorded, and arrangements should be made with establishments to secure uniform reporting of such absences to the state department of health, so that excessive sickness rates by occupation and disease may be determined and means taken for their elimination.

In carrying out these provisions the work should be done cooperatively, and, in addition to furnishing services to physicians, industry and labor, the industrial hygiene unit should be a source of information for other state agencies and the general public. The value of an educational program to acquaint physicians, industrialists, workers and various groups as to the importance of the problem cannot be overemphasized.

At the present time most state industrial hygiene units employ a very small personnel, usually a physician, an engineer, a chemist and a secretary. Even if this number of persons was doubled one could hope for only a limited improvement in the health of all the gainfully employed persons in the state unless all the resources of the health department could be drafted. This is a perfectly legitimate view of the problem, considering the method of approach which may be employed. For example, no one would dispute the fact that many of the diseases of childhood are not directly associated with the school environment; yet, this fact has not deterred health departments and physicians from doing their most effective work in the prevention of childhood diseases through the medium of the school. The same procedure may be attempted in combating adult diseases by approaching the problem through the medium of the factory. For example, the Southern health officer may feel that with the limited number of so-called industrial workers in his state, industrial hygiene activities are not justified. Yet there is no reason why the same health department cannot carry on a program dealing with nutrition, venereal disease, tuberculosis or malaria control through the industrial groups. By so doing it will be practicing effectively the promotion of public health among a large number of people. At present such programs employ the home as a means of contact. It would seem that the approach of bringing public health to the factory should commend itself from the point of view of efficiency alone.

Many health departments have limited the scope of their activities. Most of them are concerned first and foremost with the control of communicable diseases. This is as it should be, since the primary function of a health department is such control. There is ample justification for widening the scope of health work in a county, district or city to include the prevention of chronic diseases, as the national health survey has shown that chronic disease and permanent impairments alone account for six of the ten days of incapacity from illness and accidents experienced by the average person in a year.

It is desired to stress the fact that in order to carry on any kind of public health work in the factory it is necessary that the personnel know industry and industrial processes, and for this reason the persons expected to guide the work most successfully are those particularly trained in the field of industrial hygiene. As indicated earlier, a large portion of gainfully employed persons who work in small establishments have not as yet been provided a satisfactory industrial health service. The responsibility of the family physician in this phase of the problem must not be overlooked. There must be a closer cooperation between the industrial hygiene personnel in a state health department, the various local public health units and all medical practitioners, in an attempt to bring public health to gainfully employed persons and indirectly to their families.

The situation as regards industrial health constitutes a challenge which the physician ethically and morally, regardless of the particular field in medicine which he has elected to follow, cannot and should not seek to escape. He may assume leadership now with faith in his ability to serve effectively through the promotion of a cooperative and not a competitive broad health program.

ABSTRACT OF DISCUSSION

Dr. L. D. Bristol, New York: There are a few points which I might emphasize in this brief discussion. First, I like the authors' emphasis on and definition of the scope of industrial health, that it must in the future involve not only occupational disease control but also the promotion of health and the prevention of disease in general among the working population. The health program of the small industry of course needs to be emphasized. Most of the larger companies are doing a fairly satisfactory job now in this field of employee health. As the authors have indicated, the program of the smaller industries might to a certain extent be developed under public leadership, through various divisions of industrial hygiene in state departments of health. They wisely emphasized, I believe, the problem of tuberculosis in industry. Tuberculosis control has been approached through the home, the school and early childhood. If further advance is to be made, the next steps in tuberculosis control must be among employed groups. The whole case finding campaign in industry should be developed as it has been throughout public groups. The U. S. Public Health Service is to be complimented on the work which it has been doing during the last two or three years in helping to develop bureaus of industrial hygiene in various states and making possible the training of personnel with the small funds available.

Dr. H. W. Gibbons, Sacramento, Calif.: We have listened with interest to papers describing the growing efficiency of industrial medicine. Right now, the economics of industrial medicine is important. How are employees of industry who are injured or diseased outside of working hours going to be financed? By government or by private enterprise? As medical director of an insurance company, I am interested in this aspect. Many insurance companies are now issuing group insurance to employees of industrial plants, which covers nonoccupational disease and accident, hospitalization, surgical benefits and life. Sickness and accident insurance for employees disabled in the course of employment is taken care of by state industrial acci-

V 19

dent and illness laws and we are agreed that these are developing satisfactorily, but there is an economic stress among this class when the disability is not covered by compensation insurance. Private companies are experimenting with this form of insurance. In theory it works beautifully. One can determine the number of days men have been laid off and the time spent in hospitals and thus establish a satisfactory premium, but, in practice, is the same ratio going to maintain under insurance as it did when the patients had to pay their own way? Will this factor induce the insured to prolong the indemnity period? Will the doctors who treat industrial cases cooperate with insurance carriers in submitting reports and in sending an employee back to work when he is able to work, or will they aid him in claiming all the traffic will bear just because he carries a policy? I should like to suggest that, if the profession and the workers will cooperate, private insurance companies can carry such insurance successfully for a small premium which can easily be borne by the worker and the industry. If, on the other hand, the workers are going to seek more than is their due and physicians are going to help them in that, any plan of insurance will break down. The advance in efficiency of health control in industry coupled with the development of adequate insurance through small contributions is a beautiful plan to contemplate. With the cooperation of all concerned, it will work and there will be no necessity for the government to step in with socialized medicine with the attendant regimentation of our profession.

BLOOD CALCIUM, PHOSPHORUS AND PHOSPHATASE IN URINARY LITHIASIS

PARATHYROID DISEASE AS AN ETIOLOGIC FACTOR

MILES GRIFFIN, M.D.
Fellow in Surgery, the Mayo Foundation
OAKLAND, CALIF.
ARNOLD E. OSTERBERG, PH.D.
AND
WILLIAM F. BRAASCH, M.D.
ROCHESTER, MINN.

Extensive study of the etiology of urinary lithiasis by numerous workers has failed to produce a factor which can be considered as primary in all cases of stone formation in the urinary tract. However, much knowledge has been gained regarding predisposing and contributing factors. The relationship of infection and stasis to the occurrence of urinary lithiasis has been mentioned repeatedly,[1] and the role of urinary colloids and crystalloids in the formation of stones has been referred to.[2] The urinary excretion of such substances as cystine [3] and uric acid [4] are known to predispose to calculi of similar composition, and vitamin deficiencies, diseases of nutrition [5] and other metabolic disorders [6] and organic diseases [7] have been studied and designated as factors of an importance which varies widely with individual authors.

Since so many urinary stones are compounded calcium and phosphatic salts, studies of calcium and phosphorus metabolism have been followed with much interest by urologists. Comparatively recent and thorough investigative work on hyperparathyroidism has revealed that 27 per cent of a series of eighty-three patients with this disease had renal calculi.[8] Some investigators [8] have stated that parathyroid disease is the apparent etiologic factor in at least 10 per cent of the cases in which stones form in the urinary tract. Later, from 4 to 5 per cent was given by the same authors [9] as a more correct figure. It occurred to us that, if from 4 to 5 per cent was a figure representative of the incidence of parathyroid disease in cases of urinary lithiasis for the country at large, we were not recognizing hyperparathyroidism as frequently as it occurs in cases of urinary lithiasis. The purpose of this study was, therefore, to investigate the incidence of parathyroidism in cases of urinary lithiasis.

In this study, 1,206 consecutive cases of urinary lithiasis were examined for clinical evidence of hyperparathyroidism. Of this number, in 229 cases particular attention was paid to laboratory studies, including determinations of blood calcium, phosphorus and phosphatase. The range of from 9 to 11 mg. of calcium, from 3 to 4 mg. of phosphorus, and 5 units or less of phosphatase per hundred cubic centimeters of blood was used as a standard for normal evaluation. Admittedly these are narrow limits, and slight variations above or below them have not infrequently been found in other cases without urinary lithiasis or any demonstrable organic disease. Nevertheless, we felt it advisable to adhere to this narrow standard for normal values in order to insure detecting any early change which might be present in the blood of patients with urinary lithiasis. Calcium was determined by the procedure of Clark and Collip,[10] calcium oxalate being allowed to precipitate over night. Values for phosphatase were expressed in so-called Bodansky units and were determined by the technic described by Bodansky.[11] Phosphorus was determined by the technic of Kuttner and Lichtenstein.[12] We feel that these methods give results that are exact and are easily reproducible.

In these 229 cases of urinary lithiasis in which particular attention was paid to laboratory studies there were 111 cases in which the results with respect to the calcium, phosphorus and phosphatase content of the blood were higher or lower than normal in one or more determinations. In such cases the determinations were usually checked one or more times. Of these 111 cases, there were seventy-one in which the value for blood phosphorus was low and thirteen in which it was

From the Section on Clinical Biochemistry (Dr. Osterberg) and the Section on Urology, the Mayo Clinic (Dr. Braasch).

1. Braasch, W. F.: Recurring Renal Lithiasis, Proc. Staff Meet., Mayo Clin. **7**: 169-172 (March 23) 1932. Randall, Alexander: Presidential Address, J. Urol. **28**: 127-132 (Aug.) 1932. Keyser, L. D.: Recurrent Urolithiasis: Etiologic Factors and Clinical Management, J. A. M. A. **104**: 1299-1306 (April 13) 1935.

2. Joly, J. S.: The Etiology of Stone, J. Urol. **32**: 541-577 (Dec.) 1934.

3. Ewell, G. H.: Cystine Nephrolithiasis, J. A. M. A. **99**: 2160-2166 (Dec. 24) 1932. Kretschmer, H. L.: Cystinuria and Cystine Stones, J. Urol. **30**: 403-420 (Oct.) 1933.

4. Beer, Edwin: Uric Acid and Uratic Stones in the Kidney—Uric Acid Showers and Their Diagnosis, Surg., Gynec. & Obst. **43**: 436-442 (Oct.) 1926.

5. Higgins, C. C.: The Experimental Production of Urinary Calculi, J. Urol. **29**: 157-170 (Feb.) 1933. van Leersum, E. C.: Vitamin A Deficiency and Urolithiasis, J. Biol. Chem. **76**: 137-142 (Jan.) 1928. Higgins, C. C.: Production and Solution of Urinary Calculi: Experimental and Clinical Studies, J. A. M. A. **104**: 1296-1299 (April 13) 1935. Walsh, Groesbeck, and Norton, E. M.: Massive Renal Calculi in Association with Nutritional Diseases, South. M. J. **27**: 224-228 (March) 1934.

6. Albright, Fuller; Baird, P. C.; Cope, Oliver, and Bloomberg, Esther: Studies on the Physiology of the Parathyroid Glands: IV. Renal Complications of Hyperparathyroidism, Am. J. M. Sc. **187**: 49-65 (Jan.) 1934.

7. Holmes, R. J., and Coplan, M. M.: Extensive Bilateral Renal Calculosis of Rapid Development Following Fracture of the Vertebrae, South. M. J. **27**: 228-233 (March) 1934. Rosenow, E. C.: The Production of Urinary Calculi by the Devitalization and Infection of Teeth in Dogs with Streptococci from Cases of Nephrolithiasis—Summary of Results, Illinois M. J. **49**: 28-33 (Jan.) 1926.

8. Barney, J. D., and Mintz, E. R.: Some Newer Conceptions of Urinary Stone Formation, Tr. Am. A. Gen.-Urin. Surgeons **27**: 203-208 (May 15) 1934.

9. Barney, J. D., and Mintz, E. R.: The Relation of the Parathyroid Glands to Urinary Lithiasis, J. Urol. **30**: 159-167 (Aug.) 1936.

10. Clark, E. P., and Collip, J. B.: A Study of the Tisdall Method for the Determination of Blood Serum Calcium with a Suggested Modification, J. Biol. Chem. **63**: 461-464 (March) 1925.

11. Bodansky, Aaron: Phosphatase Studies: II. Determination of Serum Phosphatase: Factors Influencing the Accuracy of the Determination, J. Biol. Chem. **101**: 93-104 (June) 1933.

12. Kuttner, Theodore, and Lichtenstein, Louis: Micro Colorimetric Studies: II. Estimation of Phosphorus: Molybdic Acid-Stannous Chloride Reagent, J. Biol. Chem. **86**: 671-676 (April) 1930.

high in combination with normal values for calcium and phosphatase. Converting these figures into percentages, 31 per cent of the patients (seventy-one of 229) had low values for inorganic phosphorus and 5.7 per cent (thirteen of 229) had high values for phosphorus. For 31 per cent of the patients to have a lowered value for blood phosphorus is surprising, although the significance of this is lessened by the fact that less than half of the seventy-one patients who had a low value for blood phosphorus had a reading of less than 2.6 mg. per hundred cubic centimeters. As one might expect renal insufficiency to be present more frequently in cases of lithiasis, one might also expect a greater percentage of hyperphosphatemia as compared to hypophosphatemia because of the kidneys' inability to excrete phosphorus.

A high value for blood phosphatase was combined with a low value for blood phosphorus and with a normal value for calcium in five cases, although the value for phosphatase was significantly elevated in only three of these cases. Three of the five patients had a value for phosphorus of 2.8 mg., and two of 2.4 mg. per hundred cubic centimeters of blood. The value for blood phosphatase was high in combination with a normal value for blood phosphorus and calcium in ten cases, but this elevation was so slight as to be considered normal except in three cases. With exception of cases of hyperparathyroid disease, we found the high value for blood phosphatase related not so much to urinary lithiasis as to coexistent disease elsewhere in the body; namely, hepatic disease, osteitis deformans, arthritis and traumatic and metastatic bone conditions. The combination of low values for blood calcium, phosphorus and phosphatase was found in only one case.

The value for blood calcium was high in three cases and low in three cases, in combination with normal values for phosphorus and phosphatase. An elevated level of blood calcium was combined with a low value for phosphorus in three cases and was combined with high values for phosphatase and a low value for phosphorus in two. In only four of the eight cases in which the value for blood calcium was elevated was the value for blood calcium more than 12 mg. per hundred cubic centimeters. It is interesting to note that the highest value for blood calcium was 14.7 mg. per hundred cubic centimeters; it was encountered in a case of hyperparathyroidism.

In only the two cases in which the value was high for blood calcium and phosphatase and low for phosphorus was the diagnosis of hyperparathyroidism made. The chief complaint of one of these two patients was recurrent renal calculi, and a parathyroid tumor was found on surgical exploration. The values for calcium, phosphorus and phosphatase in the blood were 14.7 mg., 2.6 mg. and 10.2 units per hundred cubic centimeters of blood, respectively. Bilateral renal lithiasis was present in the other case and a clinical diagnosis of hyperparathyroidism was made; however, a parathyroid tumor was not found on exploration. The values for calcium, phosphorus and phosphatase in this case were 12.1 mg., 1.7 mg. and 9.8 units per hundred cubic centimeters of blood, respectively.

Albright[6] and others reported that 27 per cent of a series of twenty-three patients with hyperparathyroidism were proved at operation to have renal calculi. The two patients with hyperparathyroidism in our series had calculi, but hyperparathyroidism did not occur often enough to be considered a factor in the etiology of urinary lithiasis. Lloyd[13] cited a series of 10,000 consecutive necropsies in which only five parathyroid tumors were found.

Our study of the chemical constituents of the blood of patients with urinary lithiasis has therefore failed to throw much light on the uncovering of the definite factor in the etiology of stone formation. Albright and Bloomberg[14] have aptly said, "The practical question in any one case where there is a tendency to form renal stones is not what is the cause of stone formation but what in that individual predisposes him to stone formation." Undoubtedly some people have a higher protective factor than others. The cause of stone formation is not just the presence of excess amounts of substances which predispose to stones of like composition. Aub and others[15] found the urinary excretion of calcium and phosphorus increased to 231 per cent above normal in hyperthyroidism. Yet urinary lithiasis is relatively not a common complication of hyperthyroidism. Farquharson and his associates[16] reported studies in which making the diet acid or adding ammonium chloride to the diet increased the urinary excretion of calcium and phosphorus up to 400 per cent. Yet in our very recent experience the solution of recently formed renal stones has occurred in two cases on administration of acidifying drugs. Clinically, the elusive factor in the etiology of stone seems to be as closely related to phosphatase activity as to hyperphosphaturia and hypercalcinuria. It is not so rare to observe orthopedic cases in which stones are being formed while the patient is in the hospital. Such references are frequently encountered in the literature.[17]

Some of the results of determinations of blood calcium and phosphorus in cases of urinary lithiasis reported in the literature vary greatly from the values we obtained. One author[18] reported that 78 per cent of thirty-seven patients with urinary lithiasis had a value for blood calcium above normal, the average value for blood calcium being reported as 12.17 mg. per hundred cubic centimeters. Kerley and Lorenze,[19] however, reported a series of 294 cases (all children) in which determinations of blood calcium and phosphorus were made, and found only seven children who had significant symptoms which were related to these observations.

CONCLUSIONS

In cases of urinary lithiasis the values for blood calcium, phosphorus and phosphatase exhibit no common change which can be termed characteristic of the group. Minor variations in the value for blood phosphorus, particularly a lowered value, are not unusual but the concentration of blood calcium is very constant.

13. Lloyd, P. C.: A Case of Hypophysial Tumor with Associated Tumor-like Enlargement of the Parathyroids and Islands of Langerhans, Bull. Johns Hopkins Hosp. **45**: 1-14 (July) 1929.

14. Albright, Fuller, and Bloomberg, Esther: Hyperparathyroidism and Renal Disease, with a Note as to the Formation of Calcium Casts in This Disease, Tr. Am. A. Gen.-Urin. Surgeons **37**: 193-202 (May 15) 1934.

15. Aub, J. C.; Bauer, Walter; Heath, C., and Ropes, Marion: Studies of Calcium and Phosphorus Metabolism; the Effects of the Thyroid Hormone and Thyroid Disease, J. Clin. Investigation **7**: 97-137 (April) 1929.

16. Farquharson, R. F.; Salter, W. T.; Tibbetts, D. M., and Aub, J. C.: Studies of Calcium and Phosphorus Metabolism; XII. The Effect of the Ingestion of Acid-Producing Substances, J. Clin. Investigation **10**: 221-249 (June) 1931.

17. Ettinger, Alice, and Magendantz, Heinz: Roentgen Evidence of Extensive Calcification of the Kidneys in Osteitis Fibrosa Cystica, Am. J. Roentgenol. **31**: 592-596 (May) 1934. Holmes and Coplan.[1]

18. Marquardt, C. R.: Blood Calcium Studies in Urinary Lithiasis, Wisconsin M. J. **36**: 177-182 (March) 1937.

19. Kerley, C. G.; Lorenze, E. J., and Godfrey, E. R.: Serum Calcium and Inorganic Phosphorus Determinations in 294 Children, Arch. Pediat. **52**: 243-249 (April) 1935.

Patients with a high value for blood calcium or phosphatase who have urinary calculi should undergo a thorough investigation for some other coexistent pathologic condition.

In our study, hyperparathyroidism was found to be an etiologic factor in less than 0.2 per cent of the 1,206 cases of urinary lithiasis.

A TREATMENT FOR THE SUPERFICIAL MYCOTIC INFECTIONS OF THE GLABROUS SKIN

DOUGLAS T. PREHN, M.D.
Lieutenant (Medical Corps), U. S. Navy Dispensary, Navy Yard
NEW YORK

Skin diseases produced by fungi make up most likely the largest single group of dermatologic diseases, and for that matter make up perhaps the most common diseases of man. This is especially true where human contact is intimately frequent, as in schools, prisons, institutions, colleges, ships, clubs, dormitories, bathing beaches or pools and other places where people congregate or live close together. It is also easily conceived that infection is extensive in homes where incidence surveys have not been made or reported. Osborne and Hitchcock [1] estimated that 90 per cent of male college students indulging in athletics, from 25 to 50 per cent of high school students and 50 per cent of the general adult population have ringworm of the feet. Legge, Bonar and Templeton [2] found that 53.3 per cent of the men and 15.3 per cent of the women of the 3,100 freshman were infected, and at the terminal period of the spring semester that 78.6 per cent of the men and 17.3 per cent of the women had ringworm of the feet.

Other estimates of the incidence of glabrous skin mycotic disorders are similar to those cited.[3] Eleven ships of the U. S. Navy, six in the Orient, four on the West Coast and one on the East Coast, were surveyed, and of the 1,500 men examined 92 per cent were found affected in the early or more severe stages of ringworm disease of the glabrous skin. In 88 per cent of the cases the mycotic infection was found most prevalent between the toes or on the feet, 15 per cent on the inner thigh-scrotal-anal region, 1.8 per cent on the hands, 2.3 per cent in the axillas and 2.3 per cent in the external auditory canal of the ears.

The statement is made [4] that no general systemic condition such as acidosis is responsible, since healthy as well as sick persons are subject to the infection. Furthermore, the infection is not always a mild disease: Of 161 consecutive patients fourteen were totally disabled and thirty-two were partially disabled, and in some instances the disability lasted as long as three months. One might also add here that secondary infection is not infrequent and may subsequently develop into severe conditions, becoming a focus for septic complications or even a septicemia. The hospitals could reveal the large number of such complications.

The clinical appearance is the simplest and most reliable practical diagnosis. There are many classifications presented [5] of the different types of glabrous skin mycotic infections and many different types of fungi responsible for the lesions of the skin. These will not be discussed here. When in the history of a case the toxic contacts, the general systemic diseases such as syphilis and the susceptible sensitizations of the patient have been eliminated and a history of exposure to ringworm disease in suspected places or to infected persons has been established, the localized areas of the skin affected with the clinical appearance of the lesion will usually picture the condition. The whitened, macerated, sodden mass of epithelium between the toes most frequently found between the fourth and fifth toes and in the external auditory canal of the ears, the fissured, scaling, eczematous areas on the hands or feet, the vesicular and pompholyx or bullous lesions on the soles or on the lateral surfaces of the fingers and feet, the flattened pigment-like or moist copper-red areas with a spreading margin found on the inner thigh-scrotal-perineal-anal areas commonly known as tinea cruris, the axilla erythrasma resembling the tinea cruris lesion often involving the folds of the skin beneath the breasts or the folds of the pendulous abdomen, the less frequently encountered pityriasis versicolor, the circinate tinea infections and the chronic eczematoid ringworm, often hyperkeratotic, involving the soles of the feet and occasionally extending to the legs, or when on the hands to the forearms with or without scattered vesicles and pustules are all well known manifestations of the mycotic infections of the glabrous skin.

The differential diagnosis may be difficult in some cases, and the aid of microscopic examinations (less than 50 per cent positive), patch and intradermal tests and cultural and biochemical investigations may be of assistance; however, these methods are still too indefinite for practical routine use. Much confusion exists concerning the apparent differences between the clinical pictures of vesicular eczematous and scaling fungous ids and those from contact allergens or irritants and other causes, but, as Wise and Sulzberger [5] point out, they are convinced that in most cases no definite distinction can be made on clinical and morphologic grounds and, as far as the actual topical therapy of the presenting manifestations is concerned, there need be little if any difference in the form of treatment selected to combat eczematous eruptions due to other causes. This idea of diagnosis and treatment of fungous infections on the glabrous skin, in the main, holds true with other eczematous and eczematoid processes that resemble or are contributory factors of the same dermatologic picture.

1. Osborne, E. D., and Hitchcock, B. S.: Prophylaxis of Ringworm of the Feet, J. A. M. A. **97**: 453 (Aug. 15) 1931.

2. Legge, R. T.; Bonar, Lee, and Templeton, H. J.: Incidence of Foot Ringworm Among College Students, J. A. M. A. **93**: 170 (July 20) 1929; Ringworm of the Feet, ibid. **92**: 1507 (May 4) 1929.

3. These include articles by:
Gillman, R. L.: The Incidence of Ringworm of the Feet in a University Group, J. A. M. A. **100**: 715 (March 11) 1933.
Sharp, E. A.: Dermatomycosis and Its Treatment, U. S. Navy M. Bull. **27**: 298 (April) 1929.
Fishbein, Morris, editor: Handbook on Therapy, ed. 11, Chicago, American Medical Association Press, 1937, p. 631.
Hazen, H. H.: Eczematoid Ringworm, J. A. M. A. **83**: 1125 (Oct. 11) 1924.
Eichenlaub, F. J.: Dermatoses Encountered Among Tuberculous and Nontuberculous Ex-Service Patients, ibid. **91**: 547 (Aug. 25) 1928.
Castellani, Aldo: Mycosis, Brit. M. J. **1**: 958 (June 2) 1928.
Legge, R. T.; Bonar, Lee, and Templeton, H. J.: Epidermomycosis at the University of California, Arch. Dermat. & Syph. **27**: 12 (Jan.) 1933.
Ringworm of the Hands and Feet.[4]

4. Ringworm of the Hands and Feet, U. S. Public Health Service Bulletin E-28/E-572B, Sept. 18, 1936.

5. (a) Wise, Fred, and Sulzberger, M. B.: Year Book of Dermatology and Syphilology, Chicago, Year Book Publishers, Inc., 1937, pp. 7-27. (b) Wise, Fred, and Wolf, Jack: Dermatophytosis and Dermatophytids, Arch. Dermat. & Syph. **34**: 1 (July) 1936. (c) Carpenter, C. C.: Treatment of Ringworm of the Feet, J. M. Soc. New Jersey **33**: 467 (Aug.) 1935. (d) Wise, Fred, and Wolf, Jack: Use of the Dermal Parasiticides, J. A. M. A. **107**: 1126 (Oct. 30) 1936. (e) Peck, S. M.: Epidermophytosis of the Feet and Epidermophytids of the Hands, Arch. Dermat. & Syph. **22**: 40 (July) 1930.

The prodigious methods and drugs used in the prevention and treatment of mycotic disorders of the glabrous skin serve only to confuse the physician as well as the patient. The experts practically all state that roentgen therapy helps materially in shortening the course of the infection, but a long series of roentgen treatments serves no good purpose, does not permanently cure and should be avoided. Carpenter [5c] discusses eleven popular medicaments and then states that such an extensive armamentarium tends to produce much confusion, and the selection of what is best becomes a wearisome procedure of trial and error. Wise and Sulzberger [5a] offered a limited number of drugs, but more than fifty were outlined for selection. The more commonly known medicaments (the favored Whitfield's, Deek's ointments),[6] the volatile oils,[7] the tinctures (iodine),[8] the paints (as Castellani's),[9] the solutions (potassium permanganate or sodium thiosulfate) [10] and many other forms of treatment [11] were tried in many hundreds of cases in my experience, without any appreciable success or confidence in their routine use.

To cite one example of unsuccessful venture with one of the aforementioned treatments, an attempt was made to use the preventive sodium thiosulfate solution as recommended by Osborne.[12] The men on four ships of the Fifteenth Destroyer Division in the Far East totaling 520 men were carefully examined for clinical evidence of mycotic disorders of the glabrous skin. Ninety-three per cent were affected in some stage of so-called athletes' foot. The 6 per cent found with more extensive lesions were treated locally daily in the sick bay with different remedies, and the others were instructed to use daily the available foot baths of 10 per cent sodium thiosulfate placed in the wash rooms. It was advised that socks be boiled before they were worn. The shoes were washed inside and dried during the night for wear in the morning. It was believed that the frequent scrubbing, done more than once daily, and the subsequent splashing of the foot bath solution on the deck would aid in exterminating the source of infection or reinfection. Two monthly inspections of the feet, including the short-arm inspection, followed by lectures on the care of the feet were held. After five months of this regimen 25 per cent of the 520 men were found still to be infected. The last three inspections found little improvement in reducing the incidence of the infection. Several factors may have contributed to the failure in reducing the incidence below 25 per cent.[13] On the question of reinfection from the shoes, gasoline was tried for a month during which the men were instructed to wash out old shoes on the inside, allowing them to dry during the night at least twice a week. As this did not seem to make much difference in the reduction of the incidence, this procedure was abandoned. There was also a tendency of the men to avoid the foot baths owing to its dirty appearance after many had walked through it, and probably the uncomfortable feeling of a cold foot soaking following a bath added to this lack of complete cooperation; however, at least in the afternoon the men's clean-up was usually supervised by a member of the medical department. The idea seemed good and the method was pushed as there was a known reduction of the incidence; yet the ultimate complete success was not accomplished. Sodium thiosulfate wet dressings on more advanced active lesions was found entirely unsatisfactory and was abandoned in favor of other methods. This failure was later explained.[14]

A search for a satisfactory routine remedy over a period of seven years revealed the following:

The ointments were abandoned because they have the faculty of soiling the user's wearing apparel and other places with which they come in contact, they render an undesirable cosmetic appearance, being especially unsightly on the exposed surfaces, they are defiling and blotchy in application, and it is also possible that they assist in the spread of the infection or have a tendency in rendering the skin practically impermeable to the contained ingredients, thereby causing uncertain therapeutic action. Wise and Sulzberger [5a] state that ointments have a tendency to dam up secretion, plug follicular orifices and produce follicular infection and irritation. All the undesirable characteristics are more profound as and when the disease is found, most prevalent in the summer months or in tropical climates. Here the increased irritable heat of the body with the resulting increased perspiration spreads the melting salve on the surface, increasing its undesirable characteristics.

Liquid forms of treatment usually contain evaporating volatile substances, such as alcohol, which soon change the characteristics of the remedy, especially if the container is left uncovered, as frequently occurs with tincture of iodine. Owing to the natural oiliness of the healthy skin and the surface tension afforded by the skin secretions, an infected part held in solution for an extended period, which is usually necessary in skin lotion therapy, may allow the lotion to break down the natural barriers, causing a further extension of the infection into the adjoining uninfected skin. Also solutions, most of them made up with a dehydrating agent, may rapidly dry the skin or mumify it so that deep-seated extension of the applied remedy is difficult, thereby causing assistance to the infection and its further undermining extension. Dye paints, such as Castellani's paint, are most unsightly, stain the clothing as well, and have very little to offer in overcoming the infection as compared to other remedies. Applied wet dressings or compresses, unless repeatedly kept moist, soon dry out, adding irritation as a foreign body to the already irritated affected part. Any moist dressing is uncomfortable and avoided by the patient when not confined to bed. Soaks such as foot baths have the undesirable properties already mentioned and in addition are time consuming, which is always annoying to the patient. Relating to the proprietary remedies, most authors agree in their condemnation.[15]

6. Williams, C. M., and Barthel, E. A.: Tinea of the Toe Nails as a Source of Reinfection, J. A. M. A. **93**: 907 (Sept. 21) 1929.

7. Myer, H. B., and Thine, C. H.: The Fungicidal Activity of Certain Volatile Oils and Stearaptens, J. A. M. A. **84**: 1985 (June 27) 1925. Strickler, Albert: Fungicidal Properties of Certain Clinically Recognized Fungicides, Arch. Dermat. & Syph. **28**: 836 (Dec.) 1933.

8. Strickler.[7]

9. Legge, R. T.; Bonar, Lee, and Templeton, H. J.: Epidermomycosis at the University of California, Arch. Dermat. & Syph. **29**: 520 (April) 1934. Castellani.[5]

10. Osborne and Hitchcock.[5] Wise and Sulzberger.[5]

11. Symposium on the Treatment of Mycoses of Foot, Dermat. Wchnschr. **100**: 566 (May 18) 1935.

12. Osborne, E. D.; Putman, E. D., and Rickloff, R. J.: Personal Experiences in the Prophylaxis and Treatment of Ringworm of the Hands and Feet, New York State J. Med. **33**: 1270 (Nov. 10) 1933. Osborne and Hitchcock.[5]

13. (a) Strickler, Albert, and McKeever, W. H.: Recurrence of Infection of the Feet Due to Ringworm Fungus, Arch. Dermat. & Syph. **29**: 526 (April) 1934. (b) Jamieson, R. C., and McCrea, Adelia: Recurrence or Reinfection in Ringworm of Hands and Feet, Arch. Dermat. & Syph. **25**: 321 (Feb.) 1932. (c) Gould, W. L.: Ringworm of the Feet, J. A. M. A. **94**: 1300 (April 18) 1931. (d) Jamieson, R. C., and McCrea, Adelia: Shoes a Source of Reinfection in Ringworm of the Feet, Arch. Dermat. & Syph. **35**: 203 (Feb.) 1937. Wise and Wolf.[5a] Williams and Barthel.[6]

14. Legge, Bonar and Templeton.[9]

15. Legge, Bonar and Templeton.[9] Ringworm of the Hands and Feet.[4] Osborne, Putnam and Rickloff.[12] Carpenter.[5c]

It would seem, therefore, that the simple method of application of powder rubbed into the affected part offered the best means of local therapy on the mycotic infected glabrous skin and, with the expectation of the patient's cooperation, various prescriptions of powder remedies were tried. Some were more successful than others. After process of elimination the compounds of salicylic acid, boric acid, camphor, menthol and starch were found most satisfactory. A pharmaceutic analysis of the properties gave the clue for their successful use. Briefly, the formula has a keratolytic action which allows the ingredients to attack directly the infection beneath the surface of the dead skin. However, even as salicylic acid is an exfoliant and assists in stimulating resistance, it is usually quite irritating in higher percentages of from 1 to 3 when applied directly or in other known combinations, especially to an inflamed skin. This formula revealed a synergic action with the other ingredients, allowing even higher percentages than the usually sufficient 5, without interfering with the soothing qualities of the formula's analgesic property, most necessary to relieve the pruritus often encountered in this type of infection. The antiseptic and bactericidal or fungicidal property is well supported by the contained ingredients, allowing penetration directly to the lesion, fulfilling its mission and possibly sufficiently overcoming the allergens in the dead as well as in the surrounding skin. The gentle stimulating property brings about a mild hyperemia augmenting the process of resistance and repair. The demulcent property soothes and allays the irritation of inflamed and abraded skin, which is assisted by the absorption of irritating secretions, thereby preventing excoriation. Extreme gentleness in the action of this compound can be accomplished by diluting the ingredients with more starch.

The method of application of the compound is important. The powder should be thoroughly rubbed into the skin at least daily or more frequently, depending on the severity of the infection. When pustules or bullae form, the roof should be cut from the raised lesion and the powder thoroughly rubbed into the raw diseased surface or exposed area. Any loose skin should be torn or cut away, as likewise all scales should be removed and the powder triturated into the diseased and surrounding skin. Jamieson and McCrea [13d] emphasize the necessity of applying remedies to normal skin adjacent to the lesion since the fungi were found in normal skin from 1 to 2 inches outside the active lesion. Also, the powder should be rubbed on the skin for several weeks after the lesions have apparently cleared up in order to prevent its reappearance as the result of the ever potential reinfection. In this way it serves as a prophylactic powder. As a prophylactic powder, especially necessary when there is continuous known exposure, it seems sufficient to use it weekly and in many cases it has prevented recurrence or new infection when used monthly. No harmful effects have been noted on clothing, shoes or other material with which it comes in contact; instead, it probably assists in exterminating the source of infection or reinfection.

The most suitable formula found for routine use in the prevention and treatment of the superficial mycotic disorders of the glabrous skin is salicylic acid 5 Gm., menthol 2 Gm., camphor 8 Gm., boric acid 50 Gm. and starch 35 Gm.

A clinical trial with this powder formula was carried out on affected men aboard five ships, the Fifth Destroyer Division and the U. S. S. *Mahan*, where 91 per cent of the men, or 576, were found infected on the initial clinical inspection or examination. Eighty-seven per cent had the infection on the feet, of which 20 per cent had the pompholyx type of infection and 5 per cent the eczematoid type. Twelve per cent of the 576 men had the disorder in the thigh-scrotal-anal region—tinea cruris—of which only six complained of itching symptoms while the others did not know they had the infection. Sixteen of these sixty-nine men also had an infection of the feet, two men had infections of the external auditory canal and one had an infection on the hands. Three per cent of the 576 men affected were found with axilla erythrasma, of which five cases were unilateral, seven had involvement of the foot and two had tinea cruris. Twelve men, or 2 per cent of the 576 men, had infections of the hands, of which five men, including myself, had a severe pompholyx with an eczematoid extension involving the hands and wrists and in two cases the forearms. Ten men were found with an infection of the external auditory canal—the macerated, sodden mass combined with swelling and inflammation. It may be well to mention here that the external auditory canals were first cleaned out by irrigation or by an applicator, and, when the swelling occluded the canal, drops of the same formula made into a liquid with alcohol were added or wet plugs of the liquid were inserted until the swelling subsided sufficiently to allow application of powder. The other men were given about 2 ounces (60 Gm.) of the powder in a paper and told to rub it in three times a day, saving the spilled overflow of the powder on the paper to be used over again.

On the second inspection, from ten days to two weeks later, as the men were available, the incidence of infection was reduced to 30 per cent. In contrast to the sodium thiosulfate experiment, the men all seemed eager to cooperate and apparently all were using the powder as advised. In fact, some of the men who were not affected asked for the powder and used it as a prophylactic.

On the third inspection, which was about a month following the initial inspection, the incidence was reduced to less than 5 per cent. On the fourth inspection, completed two months after the initial inspection, no cases were discovered.

Of the five men with severe infections of the hand, three, including myself, were free from all inflammation and mycotic evidence in two weeks, except for a slight cutaneous scaling, no doubt due to the keratolytic action of the salicylic acid. The remaining two cases were cleared up a week later.

It was not possible to observe the men personally for more than two months after the completion of the treatment, and on one ship, the *Mahan*, no later check-up inspection was made. However, it is believed as a result of subsequent observations on persons who were cured of this condition that the prophylaxis remained secure, especially if the men were instructed to continue the powder periodically and on the first appearance of any evidence of infection to use the powder oftener.

CONCLUSIONS

From the clinical trial presented it seems that the powder formula has a specific application in the preven-

tion and in the routine treatment of the superficial mycotic disorders of the glabrous skin including mycotic diseases of the axillas and the perineal regions.

SUMMARY

1. There is evidently a high incidence of mycotic infection of the glabrous skin—found to be 92 per cent of 1,500 men clinically examined aboard six ships.

2. Ten per cent sodium thiosulfate foot baths were used as a prophylactic for ringworm infection of the feet on four ships having 520 men, resulting in reducing the incidence from 93 per cent to 25 per cent in five months of trial.

3. The use of sodium thiosulfate wet dressings on more advanced active lesions of ringworm infection was found unsatisfactory.

4. A formula suggested for a powder used as a routine by 576 men found infected with mycotic lesions of the skin aboard five ships reduced the incidence of infection from 91 per cent to 30 per cent in about two weeks, to less than 5 per cent in about a month, and to no infection in about two months.

Navy Yard.

RABIES

REPORT OF TWELVE CASES, WITH A DISCUSSION OF PROPHYLAXIS

MAURICE L. BLATT, M.D.
SAMUEL J. HOFFMAN, M.D.
AND
MAURICE SCHNEIDER, M.D.
CHICAGO

Between January 1929 and January 1937 twelve patients with rabies were admitted to the Cook County Hospital. All died. The diagnosis in each case was confirmed by autopsy. Rabies continues to take its deadly toll of human life, year after year, notwithstanding Pasteur's development of a successful prophylactic treatment more than a half century ago.

The series here reported comprises seven children and five adults; eleven were males; one was a Negro. The age and the racial incidence are in accord with those generally accepted, and the racial incidence evidences a certain amount of immunity in the Negro. The preponderance of males is explained by their more frequent contact with dogs.

The incubation period for our patients varied from two weeks to two months. The closer the site of the bite to the central nervous system the shorter was the incubation period. This fact was exemplified in the case of J. O., who died three weeks after receiving a bite on the face, as compared with that of W. W., whose death occurred two months after he was bitten on the foot and thigh. There was a history of preceding malaise of from two to seven days. The seven day prodrome occurred in a 17 year old white boy. He had a dog bite of the lower lip. No local treatment had been given, but he had received twenty-one daily injections of antirabic vaccine beginning one week after the injury. Immunization failed in one other child in this series. He was a white boy of 5, bitten on the face. He received no local treatment, and his inoculations were not begun until one week after the dog bite. Twenty-one injections were given in fourteen days. His prodromal symptoms began one day before the completion of the series. Three days later he died. Immunization failed in the only woman in the series. She received fourteen injections, begun one month after the bite. Active symptoms began one month after the injections had been completed—two months after injury. Her bite occurred on a finger, and the history states that the wound was cauterized. It does not state when or with what agent. Death resulted in every case in less than thirty-six hours after admission to the hospital.

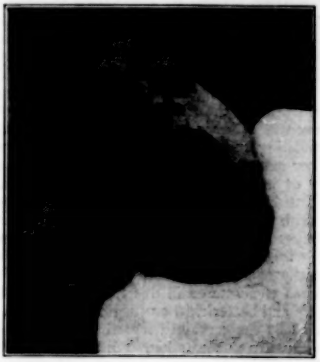


Fig. 1.—The cry accompanying the pharyngeal spasm of rabies. The illustrations are reproductions from a 16 mm. motion picture film made by us in 1932. None are of patients reported in this series.

In our series, early symptoms, when taken in conjunction with the history of a dog bite, were sufficient for diagnosis. In every instance the earliest symptom was associated with the central nervous system. Each patient gave a history of a marked change in disposition at the onset of the disease. The early stage varied in length from one to seven days. No patient was brought to the hospital in this stage.

Fig. 2.—The refusal to accept water.

On entrance to the hospital, patients not in the terminal stage were mentally clear and soon became talkative, very agitated and physically hyperactive. Accompanying the periods of agitation there were frothing at

From the Cook County Hospital, the Cook County Graduate School of Medicine and the Pediatric Department of the University of Illinois College of Medicine.

the mouth, inability to swallow and vomiting—in most instances of a bloody fluid. After such an episode the patient would be exhausted and lie quietly in bed. Convulsive seizures could be brought about by the slightest mental or physical irritation. These symptoms continued until the patient became completely narcotized, exhausted or comatose.

Pharyngeal spasms occurred and were of such severity as to cause the patient to clutch his throat and shriek in agony. Drooling of bloody saliva continued during the periods of quiescence as well as with the convulsive seizures.

Violent generalized clonic convulsions without loss of consciousness occurred in nine cases. There is no known lowing was impossible, and the effort produced pain and convulsions. Even the sight of a drinking cup apparently started pharyngeal peristalsis and precipitated a spasm of the pharynx or generalized convulsions.

Temperatures varied from 103 F. (rectal) on admission to 108 F. at death. The pulse was rapid and out of proportion to the fever and increased in frequency with each convulsion.

The laboratory examinations gave indefinite results. No conclusion could be drawn from study of the blood, since in three cases it showed leukocytosis and in one, that of a child, leukopenia. Two of the patients had albuminuria and glycosuria, while a third had only albuminuria. Spinal punctures were done in five of the

Observations in Twelve Cases of Rabies

Name, Age, Sex, Color	Incubation	Days Ill Prior to Admission	Dates of Admission and Death	Site of Bite	Prophylaxis		Symptoms	Laboratory Examinations
					Local	General		
1. E. R. 21, ♂ white	Not definite	Three	2/12/29-2/12/29	No history	0	0	Pain in left arm; maniacal; choking spells on drinking; arm and face swollen; expectorated freely; clear mentally; no convulsions	W.B.C. 26,000; R.B.C. 4,800,000, neutrophils 85, lymphocytes 15, albumin 3+, sugar 4+; spinal fluid normal
2. L. S. 51, ♂ white	1 month; 6/8/29 2 months	Two	7/29/29-7/30/29	Right hip	Unknown	0	Semicoma; frothed at mouth; angry spells; difficulty in swallowing; bloody vomitus; convulsions	Spinal fluid normal, albumin in urine 4+, sugar
3. E. B. 44, ♀ white	7/20/29	Four	9/17/29-9/19/29	Finger of right hand	Cauterization, date unknown	14 injections, begun 1 month after bite	Weakness of right hand at 1 week; inability to swallow water; restless; talkative; no convulsions	Spinal fluid 2+, Ross-Jones reaction 2, lymphocytes 125, W.B.C. 18,300, albumin 4+, many casts and white blood cells
4. L. S. 6, ♂ white	No history	Three	5/27/32-5/27/32	No history	0	0	Fever; dyspnea; nausea and vomiting; unable to drink water; mild convulsions	0
5. N. J. 6, ♂ Negro	1 month; no history	Two	10/18/34-10/18/34	Over forehead	0	0	Headache, pain over right eye; periods of agitation; would not drink; frothing at mouth; convulsions	Spinal fluid normal, W.B.C. 22,100, neutrophils 86, lymphocytes 14
6. L. M. 17, ♂ white	1 month	Seven	6/14/35-6/15/35	Left lower lip	0	21 injections, begun 1 week after bite	Difficulty in swallowing; pain in jaw and face; convulsions	0
7. W. W. 7, ♂ white	2 months; 10/7/35	Three	12/8/35-12/9/35	Foot and thigh	0	0	Nervous; twitching; difficulty in swallowing; vomiting of white foamy material; convulsions	W.B.C. 6,850, neutrophils 62, lymphocytes 36, eosinophils 2, sugar and chlorides normal, spinal fluid normal
8. C. R. 9, ♂ white	4-5 weeks	Two	8/16/36-8/17/36	Right wrist	0	0	Pain in back; nervous; irritable; difficulty in swallowing; vomiting of white foamy material; convulsions	0
9. W. R. 6, ♂ white	6 weeks	Two	9/4/36-9/5/36	Left cheek	0	0	Frightened; difficulty in swallowing; nervous; vomiting of mucus	0
10. J. S. 23, ♂ white	7 weeks; 7/15/36	Two	9/3/36-9/3/36	Left hand	0	0	Abdominal pain; vomiting; jerky movements of arms and legs; wildly disorientated; pupils did not react to light	Spinal fluid normal
11. J. M. 12, ♂ white	Two weeks	Two	10/4/36; died in one hour	0	0	0	Convulsions; vomiting; jerky movements of arms and legs; wild, disorientated; pupils did not react to light	0
12. J. O. 5, ♂ white	3 weeks; Bitten 6/7/36	Two	6/29/36; died in two hours	Face	0	21 injections, begun 1 week after bite	Fever; irritable and "crabby"; convulsions; frothing at mouth	0

clinical disease in which they are as severe. The movements simulated those produced by the rapid make and break of a powerful induced galvanic current. The patients tossed about without control and, unhappily, without loss of consciousness. One little boy, whom we observed closely, cried piteously to be held to prevent the violent movements. Mentally he was more than usually alert during the seizures. Two of the adults and one child had no convulsions at any time.

An expression of anxiety, widening of the palpebral fissures, with exposure of the scleras, and the wide-open mouth accompanying the cry of terror made up a fairly typical facies in the children. There was little or no blinking of the eyelids after the disease became evident. With each attack of pharyngeal spasm the mouth was opened wide and there was a shriek of terror. Swal-

cases, and in only one was a change noted. The patient (E. B., patient 3 in table) was a woman who had a lymphocyte count of 125 and a 2 plus Ross-Jones reaction. These observations are compatible with encephalitis. The apparent lack of meningeal involvement is demonstrated by the absence of changes in the spinal fluid in four of the five cases in which the fluid was examined.

Treatment was entirely symptomatic. Its object was to induce rest, prevent suffering and control convulsions. Large doses of sedatives were needed. In adequate doses chloral, bromides, avertin with amylene hydrate and morphine were equally effective. A dark, quiet room without drafts or other disturbances was conducive to control of the convulsions. Attempts to give food or liquid are contraindicated.

We are presenting, in the accompanying table, the clinical histories of these patients for the purpose of encouraging active interest and militant effort toward the eradication of this universally fatal disease. Eradication must be brought about through the education of the public to the dangers of uncontrolled dogs, to the possible result of an animal bite and to the necessity for the immediate medical treatment of such a bite.

Fig. 3.—This is not fear of water. It is the patient's recognition of the inability to swallow.

Since in over 90 per cent of a large series of reported cases (and in all of ours) the disease occurred as a result of a dog bite, first attention should be directed to the elimination of the disease in this animal. To accomplish this the following measures are necessary: (1) the institution of an effective national and interstate quarantine period of observation for dogs not constantly caged or on leash, (2) the impounding or destruction of all stray dogs, (3) the rigid enforcement of statutes relating to licensing and to the impounding as strays of dogs not licensed, (4) the requiring of antirabic inoculation of all dogs as a requisite to the issuance of a license and repetition of inoculation at six month intervals[1] and (5) the muzzling of all but working dogs when not on leash or on the owner's premises.

Fig. 4.—The palpebral orifice between convulsions. This wide-eyed stare is constant and characteristic.

The second phase of the problem demands the prompt reporting of all bites to public health authorities so that the dog which has inflicted a bite may be placed under veterinary observation for two weeks.[2] As a rabid animal lives but five or six days, a dog which lives beyond that period and does not acquire the disease in the two weeks of observation may be considered nonrabid and returned to its rightful owner. Strays should be publicly impounded and destroyed. If avoidable, a dog should not be killed during capture. If it is killed or dies while under observation, the brain should be examined for Negri bodies.

The bitten person must report immediately to a physician for treatment. The treatment of animal bites has been standardized. Deviation from the standard is not in accordance with medical experience. Every animal bite in which the skin is broken should be cauterized immediately with fuming nitric acid, a glass rod or capillary pipet being used. The acid should be carefully used and not neutralized. Such cauterization not only insures against the pyogenic infection common after bites but if done thoroughly within forty-eight hours is an important factor in the prevention of rabies.[3]

Antirabic vaccine should be administered (1) to any person bitten by or contaminated in any way by the saliva of an animal known to be rabid and (2) to any one bitten by an uncaptured stray animal.

When the bite is on the head or the neck, administration of the vaccine should be begun immediately but may be discontinued if the animal is proved nonrabid after impounding and observation. A negative report for Negri bodies on an animal killed before sufficient time has elapsed for such bodies to form is not an indication to discontinue treatment.

When the bite is by a sick dog or a dog which becomes sick while under observation, injections should be continued until rabies is definitely ruled out. If the report is positive, the series of injections should be completed.

The Semple modification of the Pasteur treatment is commercially available and should be given twice daily for from twenty-one to twenty-eight doses for a bite about the head or neck. For a mild bite in a region of the body distant from the brain, fourteen daily doses are considered adequate.

In the series of cases here reported not one patient was treated in accordance with the rules mentioned. In some instances cauterization was done late or not at all, and in others the administration of vaccine was begun late or not at all. The result was death.

The effectiveness of antirabic vaccine is best estimated from the statistics reported by McKendrick.[4] He reports that 162 persons (0.23 per cent) died of rabies in a series of 69,541 who had been given prophylactic vaccine. There were nineteen instances of postvaccinal paralysis, a percentage of 0.027, in his series. No analysis of cauterization in his series is available.

Statistics on dog bites in the United States are not available. However, Illinois may be considered as a "sample" of the occurrence of bites in thickly populated states. In 1936 in this state 18,466 persons were reported to the department of public health as having been bitten by dogs. Ten deaths occurred from rabies. The cost and inconvenience of local treatment and immunization of this large group of people deserve serious consideration. Even if the disease were not a fatal one, the fact that 18,466 people were reported bitten should arouse public sentiment favoring the control of dogs. The compilation of adequate statistics for

1. McGaugh, E. T.: Rabies, a Continuing Challenge, South. M. J. **29**: 556 (June) 1936. Mulcahy, J. V.: Experience with Canine Antirabic Vaccine-Canine-Feline Practice, published by North American Veterinarian, Jan. 12, 1928. The value of inoculation even under these circumstances is questioned by some authors; e. g., Barnes, M. F.; Metcalf, A. N.; Martindale, W. E., and Lentz, W. J.: Canine Rabies: Experimental Vaccination, Am. Vet. A. **84**: 740 (May) 1934.

2. Manual for Health Officers, State of Illinois, Dec. 31, 1935.

3. Olsen, Robert: The Control of Rabies in New York City, Pub. Health Rep. **50**: 1087 (Aug.) 1935.

4. McKendrick, A.: Fifth Analytical Review of Reports from Pasteur Institutes on the Results of Antirabies Treatment, Quart. Bull. Health Organ. **3**: 613-653 (Dec.) 1934.

the United States on dog bites and on loss of life by man and animal from rabies transmitted by dogs should be the basis for a campaign of public education. The result of such education would be the eradication of rabies.

COMMENT

All bites by animals should be regarded with suspicion. The animal should be kept under observation

Fig. 5.—The wide-eyed stare during a rabic convulsion.

for a length of time sufficient to allow clinical and laboratory diagnoses to be made. Stray dogs and cats have no place in a civilized social order.

Wounds made by the bites of animals should immediately be cauterized with nitric acid. The Pasteur treatment or one of its modifications should be instituted in accordance with rules outlined and accepted.

Fig. 6.—The bloody drooling and facial expression accompanying the pharyngeal spasm of rabies. Note the hand on the throat. This is characteristic.

The twelve persons whose case reports are included died after suffering great agony and might have been saved if adequate prophylactic measures had been instituted immediately. All were infected by dog bites. Stringent enforcement of regulations governing ownership, licensure, muzzling and leashing of dogs would have prevented the bites.

The extent of this problem is evidenced by the fact that in the state of Illinois alone 18,466 dog bites were reported to the state department of public health in 1936 and that there were ten deaths from rabies. A knowledge of similar facts would divulge a tremendous loss of time and of lives of human beings and animals in the United States from a preventable cause. When such knowledge becomes public it will be of inestimable educational value in the eradication of this dreadful malady.

185 North Wabash Avenue.

TYPHOID PYELONEPHRITIS, RENAL TYPHOID FEVER

HOBART A. REIMANN, M.D.

PHILADELPHIA

The typhoid bacillus like other members of the Eberthella group of bacteria is usually associated with disease of the intestinal tract, yet many instances occur wherein it localizes and causes infection elsewhere in the body. The frequency with which typhoid bacilli invade the blood during typhoid fever accounts for their dissemination to other parts of the body, and when localization does occur elsewhere it is usually regarded as a complication. Serious diagnostic problems arise when the bacilli attack vital areas like the meninges, the lungs or the kidneys, especially if intestinal symptoms are minimal or absent, as they sometimes are. Etiologic diagnosis under these circumstances is of especial importance, since patients with typhoid pneumonia or typhoid renal infection are dangerous as disseminators of infection and their excretions may spread typhoid bacilli widely unless proper measures are used to disinfect the sputum or urine before disposal. In the case of typhoid renal infection, etiologic diagnosis is apt to be missed unless careful differential bacteriologic tests are made. Since the colon bacillus, which closely resembles the typhoid bacillus, is by far the commonest cause of pyelitis or pyelonephritis, gram-negative bacilli found in purulent urine may be dismissed as colon bacilli in routine laboratory diagnosis if no further study is made. Other gram-negative bacilli may also cause infection of the urinary tract. Neter [1] recently collected fourteen cases of infection caused by Bacterium dysenteriae and added three cases of his own in which symptoms arising from the intestinal tract were absent. The important point to emphasize in infections of the urinary tract, as with infections of the respiratory, digestive and other systems, is that diagnostic anatomic terms such as pyelitis or pyelonephritis are no longer sufficient. It is necessary for purposes of preventive medicine and specific therapy to establish etiologic diagnoses by bacteriologic methods in every case and to employ such terms as colon bacillus pyelitis, pneumococcus type XIV pyelonephritis or typhoid pyelonephritis as the case may be.

According to Patch,[2] typhoid infections of the kidney are more common than has been generally believed. In one series of cases [3] pyuria was present in 17 per cent of cases of typhoid fever. MacKenzie [4] recovered B. typhosus and B. paratyphosus four times among 468 samples of catheterized urine. The typhoid lesions most commonly found in the kidney are acute bilateral cortical and interlobular areas of suppuration with pyelitis, ureteritis, cystitis and perinephric abscess. Chronic pyonephrosis may result. The onset of the renal infection may occur during an attack of typhoid, during convalescence or at a later date, sometimes many years afterward. In certain cases there may be no history or clinical or pathologic evidence of intestinal involvement at all.

From the Department of Medicine, Jefferson Medical College and Hospital.

1. Neter, Erwin: Infections of the Urinary Tract Due to Bacterium Dysenteriae, J. Infect. Dis. **61**: 338-340 (Nov.-Dec.) 1937.
2. Patch, F. S.: Typhoid Infections of the Kidney, J. Urol. **14**: 199-221 (Sept.) 1925.
3. Blumer, George: Pyuria in Typhoid Fever, Johns Hopkins Hosp. Rep. **5**: 327-342, 1895.
4. MacKenzie, D. W., and Cochrane, W. J.: A Preliminary Report on the Bacteriology of Ureteral Cultures, J. Urol. **12**: 113-119 (Aug.) 1924.

Typhoid pyelonephritis or renal typhoid, with which this paper deals, is an uncommon complication of typhoid fever, and is rarer still as a primary disease without evidence of intestinal infection. Posselt [5] was able to find only one report of an authentic case with necropsy in which the disease was limited entirely to the kidney without symptoms or other evidence of intestinal infection. He cites three other cases in which clinical studies alone were made. In the present case report another patient with bilateral typhoid pyelonephritis is described in whom no evidence of intestinal typhoid fever was present.

REPORT OF CASE

History.—A youth aged 17 lived in Bristol, Pa., but went to work on a farm in July 1937, where he drank water from a pump. He stated that the urine began to be dark or reddish about August 5. About a week later he noted the gradual onset of headache and pains in the back, legs and arms. August 15 a chill occurred, followed by sweating, and he felt ill enough to go to bed. Chills recurred daily for three days. He had several nosebleeds. He was admitted to the hospital August 19, probably about the eighth day of illness, with a fever of 39.4 C. (103 F.) and a pulse rate of 96.

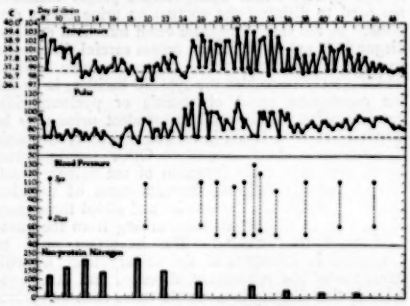


Fig. 1.—Record of the temperature, pulse rate, blood pressure and nonprotein nitrogen of a patient with typhoid pyelonephritis.

He did not remember ever having had typhoid fever, venereal infection or other serious illness but had usually enjoyed good health. The patient was well developed but drowsy and obviously very ill. The pharynx was reddened. The heart and lungs were normal. The blood pressure was 113 systolic and 70 diastolic. There were marked tenderness and protective rigidity in the right upper quadrant of the abdomen. The spleen and liver were not palpable because of the rigidity. There was tenderness in the right lumbar region posteriorly. The red blood cells numbered 3 million, the leukocytes 5,800. The hemoglobin content was 60 per cent. There was slight albuminuria, the specific gravity of the urine was 1.002, and 200 leukocytes and a few erythrocytes were present in a high power microscopic field in an uncentrifuged sample. The total quantity of urine in twenty-four hours was 1,500 cc.

The intern suspected (1) pyelonephritis of the right kidney, (2) typhoid fever and (3) subacute bacterial endocarditis. A culture was then made of a sample of urine and a pure growth of B. typhosus was recovered, but the Widal reaction and blood culture were negative. The nonprotein nitrogen measured 123 mg., the creatinine 7 mg. A diagnosis of typhoid pyelonephritis was made.

The patient's condition remained about the same for several days, except for repeated vomiting and an increase in the amount of nonprotein nitrogen as shown in figure 1. The temperature then declined and he felt and looked better. On the seventeenth day the condition became worse, although the temperature remained low. A transient erythematous eruption, believed to be toxic in origin, appeared over the extensor surfaces of the arms, legs and back. The output of urine varied between 1,500 and 2,000 cc. a day, increasing to 2,500 and 3,000 cc. after the seventeenth day, and many red blood cells were present. The amount of nonprotein nitrogen in the blood rose to 205 mg. and the creatinine to 9.6 mg. The patient was more stuporous and appeared to be approaching a uremic state. The blood pressure did not rise. A few rose spots appeared on the abdomen. He was given dextrose solution intravenously.

The temperature rose again to higher levels on the twenty-fifth day and remained high for ten days, as shown in the chart, but the patient slowly improved clinically. The amount of nonprotein nitrogen in the blood gradually returned to normal. The systolic blood pressure, surprisingly, was never elevated, except on one occasion when it was 130; the diastolic pressure dropped to 50. There was no edema. The ocular fundi showed no abnormalities. A pyelogram after the intravenous injection of an opaque iodinized substance (skiodan) was made on the thirty-fourth day. Both kidneys appeared to be normal in size and shape. The substance was too faintly visible to determine the shape of the calices of either kidney. The bladder after one hour was faintly discernible. Albuminuria, pyuria and hematuria persisted, and in tests on the thirty-ninth day the output of phenolsulfonphthalein was 45 per cent and the urea clearance test 52 per cent of normal. Typhoid bacilli were present in most samples of urine until the fifty-fifth day. The urea clearance test on the sixty-sixth day showed improvement up to 83 per cent clearance. No granular casts were seen until the seventieth day. The blood leukocytes never exceeded 9,500 and the erythrocytes averaged about 3 million. The Widal test and blood culture were never positive.

After the forty-second day the temperature gradually declined and reached normal on the forty-eighth day. The patient improved, but hematuria, cylindruria and pyuria persisted. On the fifty-second day another pyelogram revealed that the opaque substance appeared in the kidneys five minutes after intravenous injection, but the shadow did not become dense as would be expected normally. The pelvis and calices of both kidneys appeared normal in shape. The ureters were catheterized by Dr. David M. Davis on the sixty-third day, and pus and blood were found in the urine from both kidneys. Cystoscopy showed no evidence of obstruction or anomaly. The bladder wall was normal.

The problem of therapy with mandelic acid was considered early in the illness, but the drug was not given then because of the possible danger of aggravating the severe renal infection. Later, when the acute stage had passed and because of the persistent typhoid bacilluria, syrup of mandelic acid 10 cc. four times a day was given on the sixty-fifth day and continued for two weeks. Cultures made of the urine after this time were sterile. The patient resumed good health but albuminuria from 20 to 60 pus cells per high power microscopic field and hyaline and granular casts were present in the urine when the patient was discharged November 14, ninety-five days after the onset of his illness.

Follow-Up Study.—The patient was induced to reenter the hospital for study in June 1938, ten months after the onset of his illness. Since leaving the hospital in November he had resumed his usual mode of life, but in April he left school one day feeling feverish. He had two shaking chills several hours apart and a temperature of 38.9 C. (102 F.). The urine at the time became a dark brownish red. After three days in bed he recovered. No studies were made of this illness, which presumably was a recurrence of his renal infection. When he was reexamined in June no abnormalities were found other than the laboratory data. The temperature and pulse rate were normal; the blood pressure was 100 systolic and 75 diastolic. The weight was 64 Kg. (141 pounds). The amount of urine per day varied from 1,000 to 1,500 cc. The specific gravity in two concentration tests was rather fixed and varied from 1.010 to 1.018. Albuminuria (1+), granular casts and red blood cells were present in all samples examined. Leukocytes were

5. Posselt, Adolf: Atypische Typhusinfektion: Typhus ohne Darmerkrankung (Extraintestinale Typhuslokalisationen mit spezieller Berücksichtigung der primären typhosen Gallenwege und Leberprozesse), Ergebn. d. allg. Path. u. path. Anat. **16**: 184-340 (1. abt) 1912.

present in normal numbers. Four samples of urine were sterile on culture. The urea clearance was 84 per cent of normal and the urea nitrogen of the blood measured 16 mg. The plasma proteins totaled 8.5 mg., of which 4.7 was albumin and 3.8 globulin. A pyelogram made after the intravenous injection of an opaque substance showed no abnormalities. The hemoglobin was 70 per cent and the red blood cells numbered 4,100,000. The ocular fundi were normal. Cultures of the feces and duodenal contents were negative for B. typhosus.

Several peculiarities stand out with regard to the diagnosis of pyelonephritis; the blood pressure did not rise perceptibly, although the blood metabolites were greatly increased and roentgenographic and other evidence of diminished function of the kidneys were present; casts did not appear in the urine until the seventieth day, and no changes were noted in the eyegrounds. Nevertheless all other evidence, including the uremic symptoms and the results of ureteral catheterization, indicated the existence of bilateral pyelonephritis.

The question may be raised as to whether the case can be considered to be of "primary" typhoid pyelonephritis. In addition to the systemic symptoms of typhoid fever, evidence of renal insufficiency and pain in the right lumbar region pointed to a localization of the infection in the kidneys almost at the beginning of the disease. Dark urine was actually noted by the patient before the onset of clinical symptoms, but reliance on his observation is uncertain. It is probable that the patient was infected by drinking contaminated water on the farm and that the bacilli entered the blood from some place in the intestine. Flexner [6] believed it possible for typhoid bacilli to pass through the bowel wall into the blood without leaving a lesion, but it is very likely that in most cases renal infection is secondary to a lesion at the portal of entry in the bowel no matter how trivial or symptomless the latter may be. There is no evidence in the case described here that the intestine was ever involved in an inflammatory reaction, since diarrhea was not noted and blood and typhoid bacilli were never found in the feces. Controversy on this point, however, is unimportant. The important fact is that the kidneys may bear the brunt of a typhoid infection regardless of the portal of entry or pathway of infection, and the symptoms of pyelonephritis may dominate the illness.

As to the mode of infection of the kidneys, it is generally believed to be, and most likely is, blood borne. Infection is especially liable to occur during bacteremia if the kidney is not normal, that is if any factors such as stone, trauma, hydronephrosis, congenital anomaly or other conditions are present to cause obstruction to the flow of urine. Hematogenous infection usually results in disease of both kidneys, and the lesions are found in the cortex and medulla since both areas are supplied with blood by branches of the arcuate artery as shown in the inset in figure 2. Another route of infection to the right kidney is said to exist in the communication of the lymphatics between the ascending colon and the capsule of the kidney (fig. 2), which may be of particular importance in typhoid fever or other enteric disease. There is also known to be a communication between the lymphatics of the kidney substance with those of the fatty capsule (inset *a*, fig. 2). This communication may account for the occasional development of perinephric abscess in typhoid fever. After infection becomes established in the kidney it may spread from place to place by way of the meshwork of lymphatics around the tubules and glomeruli, extending from the tip of the papilla to the capsule. It is conceivable that the involvement of much of the renal substance may eventually lead to permanently damaged secreting tissue as genuine interstitial nephritis, resulting in the so-called schrumpfniere, or granular contracted kidney.

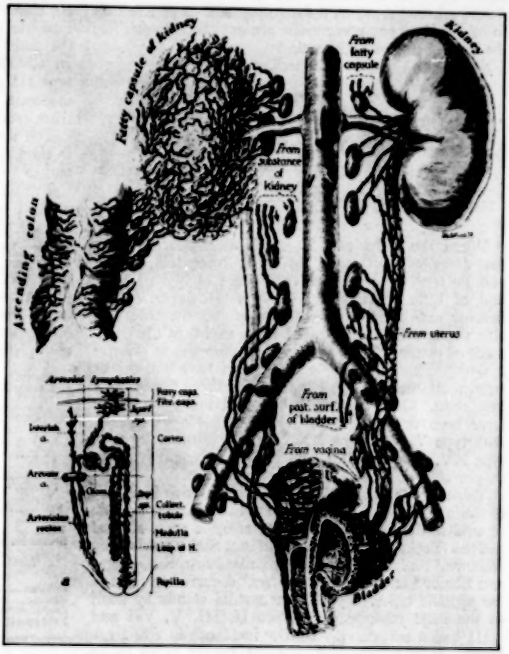


Fig. 2.—Schematic diagram of possible pathways of infection to the kidney. The lymphatic connection between the ascending colon and the capsule of the right kidney is shown. The arterial system in inset *a* shows how hematogenous infection may occur in any portion of the kidney and how it may spread by way of the network of lymphatics which extend from the tip of the papilla through the kidney substance and communicate with the lymphatics of the renal capsule. (Reproduced by courtesy of Lea & Febiger from chapter XX, Infections of the Kidney by H. A. Reimann in The Kidney in Health and Disease, Hilding Berglund and Grace Medes, 1935.)

SUMMARY

In a case of typhoid pyelonephritis presenting systemic symptoms and signs of typhoid fever lasting forty-seven days, the clinical features were remarkable in that no symptoms referable to the intestinal tract were noted. The main interest centered about the typhoid state with threatened uremia and evidence of retention of metabolites, typhoid bacilluria, pyuria,

6. Flexner, Simon: Certain Forms of Infection in Typhoid Fever, Johns Hopkins Hosp. Rep. 3: 343-378, 1893.

111
938

hematuria and pain in the right lumbar region, which were present as early as the eighth day of illness. The patient recovered, but pyuria, bacilluria and hematuria persisted. Typhoid bacilli disappeared from the urine after the administration of mandelic acid. Evidence of active renal disease ten months after the acute attack supports the growing mass of evidence that renal infections, particularly in childhood, must be looked on as a cause of subsequent kidney disease.[7] Whether chronic nephritis and hypertension will eventually develop in this case can be determined only by future examination.

It is important to establish etiologic diagnosis promptly in all cases of acute or chronic pyelonephritis, since there is no doubt that patients like the one described may serve as a dangerous source of infection to others if proper precautions are not taken to sterilize the urine before its disposal.

Jefferson Hospital.

THE USE OF SERUM IN THE TREATMENT OF THE HIGHER TYPES OF PNEUMONIA

NORMAN PLUMMER, M.D.

NEW YORK

When the thirty-two types of pneumococcus were first described by Cooper, Edwards, Rosenstein, Walter and Peizer,[1] the work was considered highly academic and of little practical significance. However, chiefly because antipneumococcus serum is still the only specific therapeutic agent proved to be useful in the treatment of pneumonia and because all attempts to prepare a nonspecific or a polyvalent serum have failed, the separation into the higher types has become increasingly important. Only two of the original thirty-two types have been dropped: type XXVI, cross agglutinating with type VI, and type XXX, cross agglutinating with type XV. The remaining thirty types account for over 99 per cent of all strains of pneumococcus.

Table 1 was prepared to show the relative incidence of the more frequent types of pneumococcic pneumonia of adults. Seventy-eight per cent of 6,545 cases studied in New York, Boston, Cincinnati and San Francisco by Bullowa,[2] Finland,[3] Benjamin, Blankenhorn, Ruegsegger and Senior [4] and Kohl and Reitzel,[5] occurred in eight of the specific types. Type I pneumonia stands by itself as the most common, but types II, III, V, VII and VIII had a surprisingly similar incidence in this large series. It is noteworthy that the higher types cause over 50 per cent of all pneumococcic pneumonia. Preparations of concentrated serum for types IV, V, VII and VIII, as well as for types I and II, have already been accepted by the Council on Pharmacy and Chemistry. In addition, serum is at present being used for types III, VI, XIV and XVIII, and within a short time serum will have been prepared for all thirty types.

This report is presented to give my experience and that of my associates with concentrated serum in the treatment of pneumonia due to the pneumococcus of types other than I and II. In the ten year period 1928 to 1938, 561 cases of pneumonia of types other than I, II and III were studied, 492 at Bellevue Hospital and sixty-nine at New York Hospital. The distribution of the different types and the number of deaths from each type are given in table 2. One hundred and eleven of the patients received specific antipneumococcus serum. In addition, during the last year nine patients with type III pneumonia were treated with rabbit antipneumococcus serum. In 145 cases of the less frequent types there were thirty-eight deaths (26 per cent).

The methods of treatment have changed from time to time, following a trend to procure more rapid typing and to treat the patients earlier.

Typing in the earlier cases was done by the mouse method of Avery, but this was soon supplanted by Sabin's slide agglutination method, and in the past five years the Neufeld method, as described by Sabin,[6] has been the one principally used. By this procedure the diagnosis was made in a good proportion of the cases within one hour of the time at which typing was instituted. Specimens other than sputum, such as material swabbed from the throat, blood for culture, spinal fluid and pleural fluid, were also studied by the Neufeld method. In some instances preliminary cultures and other modifications of the method were necessary. Most of the type determinations were repeated at least once before the final diagnosis was made, although the use of serum was usually started after the first report. In most of the cases at least one blood culture was made. Punctures of the lung were performed in only a few of the cases, because of the possible complications of this procedure.

The mode of administering serum also was changed a number of times during the ten year period, chiefly because of improvement in the preparations used. The first patients were treated with unrefined horse serum, which produced reactions with most injections and which necessitated divided doses of serum. Methods

TABLE 1.—*The Incidence in Adults of the More Prevalent Types of Pneumococcic Pneumonia*

Type	Cases	Percentage
I	1,730	26.3
II	646	9.9
III	780	11.9
IV	296	4.4
V	533	8.1
VII	468	7.2
VIII	489	7.5
XIV	179	2.7
Remaining strains	1,444	22.1
Total	6,545	

	Cases
Bullowa	3,730
Finland	2,229
Benjamin and his associates	485
Kohl and Reitzel	111

7. Longcope, W. T.: Chronic Bilateral Pyelonephritis: Its Origin and Its Association with Hypertension, Ann. Int. Med. **11**: 149-163 (July) 1937.

From New York Hospital, the Second (Cornell) Medical Division of Bellevue Hospital and the Department of Medicine, Cornell University Medical College.

Read before the Section on Pharmacology and Therapeutics at the Eighty-Ninth Annual Session of the American Medical Association, San Francisco, June 17, 1938.

1. Cooper, Georgia; Edwards, Marguerite, and Rosenstein, Carolyn: The Separation of Types Among the Pneumococci Hitherto Called Group IV and the Development of Therapeutic Antiserums for These Types, J. Exper. Med. **49**: 461 (March) 1929. Cooper, Georgia; Rosenstein, Carolyn; Walter, Annabel, and Peizer, Lenore: The Further Separation of Types Among the Pneumococci Hitherto Included in Group IV and the Development of Therapeutic Antisera for These Types, ibid. **55**: 531-554 (April) 1932.

2. Bullowa, Jesse G. M.: The Management of the Pneumonias, London, Oxford University Press, 1937.

3. Finland, Maxwell: The Significance of Specific Pneumococcus Types in Disease, Including Types IV to XXXII (Cooper), Ann. Int. Med. **10**: 1531-1543 (April) 1937.

4. Benjamin, Julien E.; Blankenhorn, Marion; Ruegsegger, James M., and Senior, Fannie A.: A Study of the Diagnosis and Treatment of Lobar Pneumonia According to Types and Specific Serum Therapy, Ann. Int. Med. **11**: 437-447 (Sept.) 1937.

5. Kohl, Cordula, and Reitzel, R. J.: Type Specificity in Pneumonia and Pneumococcic Infections, J. A. M. A. **106**: 1557-1561 (May 2) 1936.

6. Sabin, Albert B.: Immediate Pneumococcus Typing Directly from Sputum by the Neufeld Reaction, J. A. M. A. **100**: 1584-1586 (May 20) 1933.

have now been devised for refining and concentrating both horse and rabbit serum, making it possible to obtain preparations that are highly concentrated and almost entirely devoid of reaction-producing substances. The serum can now be given in larger single doses.

When serum is being administered, either rabbit or horse, refined or unrefined, all the precautions against allergic and other foreign protein reactions must be taken. A fresh preparation of epinephrine, 1:1,000, should always be at hand. The history should be taken, because it occasionally reveals the only clue for discovering an allergic state. Both the ophthalmic and the intracutaneous test, in our experience, have been found valuable as preliminary tests for sensitivity. A positive ophthalmic test with a 1:10 dilution of whole serum is considered a contraindication to the use of serum. A positive intracutaneous test is not a contraindication to the further injection of serum but serves as a warning against a possible allergic reaction. It is true that a good percentage of the patients with a positive intracutaneous test can take serum intravenously without any further sign of reactivity. The intracutaneous test with rabbit serum has been found to be just as reliable as that with horse serum.

After the two tests, our present routine is to give 0.1 cc. of therapeutic serum intravenously. If there have been no untoward reactions after one and a half hours, either 1 cc. or 5 cc. is given, the dose depending on the preparation used and the patient being treated. The third dose is given one and a half hours after the second injection and is either the remainder of the full estimated dose or the largest amount that it is believed the patient will tolerate without a reaction. Experience has shown that the massive injection is preferable to a divided dose; however, reactions should be prevented. It has been demonstrated that chills and other reactions can frequently be avoided by giving the serum in gradually increasing amounts. We feel that the thermal reactions are harmful rather than beneficial to patients with pneumonia, and our method of administration has always been planned to avoid as many reactions as possible. Our experience in giving acetylsalicylic acid and other drugs before the injection of serum as a prophylactic measure against thermal reactions has not been favorable.

Our investigation shows clinical and statistical evidence of the value of concentrated serum in the treatment of the pneumonias of the higher types. Many patients with pneumonia of a higher type, particularly of type IV, V, VII, VIII or XIV, which types are seen most commonly, show a clinical response to early serum treatment similar to that noted in patients with type I pneumonia. The temperature drops rapidly, very much as in a normal crisis, and all symptoms of toxemia frequently disappear within twenty-four hours of the institution of treatment. In addition, the effect on bacteremia seems to be as marked as that described with type I serum. The accompanying charts show the clinical course of patients treated early with an adequate amount of potent serum. Chart 6 shows the striking clinical effect of rabbit antipneumococcus serum of type XVII in a case of postoperative pneumonia.

The results of treatment with specific serum on the mortality rates for pneumonia of types IV, V, VII, VIII and XIV in 104 cases are shown in table 3. A reduction in the mortality rate is noted for types IV, V and VIII, and there is a slight lowering of the percentage for the entire series. These figures are not very striking, and one must refer to the larger series of collected cases in order to formulate any opinion on this subject. Heffron [7] has recently collected from the literature all the cases of these more frequent higher types. This series is also shown in table 3. A reduction in the number of deaths is noted for all the types except type IV, for which the number of cases is so small that the results may be misleading. A striking effect is noted for types V, VII and VIII, and the reduction from 27.2 per cent to 16.9 per cent in the mortality rate for the total series of 563 cases is also definite.

TABLE 2.—*Distribution of Types of Pneumococcic Pneumonia in the Present Series*

Type	Cases	Deaths	Type	Cases	Deaths
IV	78*	19	XVIII	8	1
V	119*	34	XIX	7	2
VI	32*	11	XX	10	5
VII	110*	22	XXI	1	0
VIII	73*	17	XXII	8	2
IX	17*	4	XXIII	7	3
X	17	6	XXIV	1	0
XI	4	1	XXV	9	2
XII	8	2	XXVII	1	0
XIII	11	3	XXVIII	5	1
XIV	22*	5	XXIX	3	0
XV	1	1	XXXI	..	..
XVI	..	..	XXXII	1	0
XVII	4*	0			
Total				561	141

* Includes cases in which serum was used and cases in which it was not used.

COMMENT

The present investigation, together with figures obtained from similar studies,[8] emphasizes the significance of pneumonia caused by the higher types of the pneumococcus. The mortality rates for these types, while not as high as those for types II and III, are sufficiently high to indicate the severity of the infections. The incidence of the more frequent of the higher types is almost the same as that of types II and III; the rarer types when grouped together still account for a good number of cases of pneumonia. It is important however that, when the thirty diagnostic serums are used, less than 1 per cent of pneumonias are unclassified.

TABLE 3.—*Mortality Rates With and Without the Use of Serum Compared with the Rates for Similar Series of Collected Cases*

	No Serum			Serum		
Type	Cases	Deaths	Mortality, %	Cases	Deaths	Mortality, %
Heffron's collected cases						
IV	151	30	19.9	70	23	32.9
V	511	168	32.9	216	34	16.2
VII	419	104	24.8	154	20	13.0
VIII	747	176	23.6	102	10	9.8
XIV	185	66	35.7	27	8	29.6
Total	1,813	494	27.2	563	95	16.9
Present series						
IV	66	17	25.8	12	2	16.7
V	82	29	35.4	30	5	16.7
VII	88	15	17.0	31	7	22.6
VIII	48	12	25.0	27	5	18.5
XIV	18	3	16.7	4	2	50.0
Total	302	76	25.2	104	21	20.2

7. Heffron, Roderick: To be published.

8. Finland, Maxwell, and Tilghman, R. Carmichael: Clinical and Immunological Observations in Cases of Pneumococcus Type V Pneumonia Treated with Specific Antibody, New England J. Med. **215**:1211-1221 (Dec. 24) 1936. Rosenblüth, Milton B., and Block, Morris: Pneumonia Due to Type V Pneumococcus, Arch. Int. Med. **60**:567-573 (Oct.) 1937. Finland, Maxwell; Tilghman, R. Carmichael; Ruegsegger, James M., and Dowling, Harry F.: Clinical and Immunological Observations in Cases of Pneumococcus Type VII Pneumonia Treated with Concentrated Type-Specific Antibody, Am. J. M. Sc. **193**:59-81 (Jan.) 1937. Bullowa.[2] Finland.[3] Benjamin and his associates.[4] Kohl and Reitzel.[5]

111
938

Perhaps the greatest advance in the past few years as far as pneumonia is concerned is the greater appreciation by the medical profession and various community and public health organizations of the seriousness of this disease and the potentialities of serum and other prophylactic measures in its control. Many states and communities are now supporting expensive pneumonia

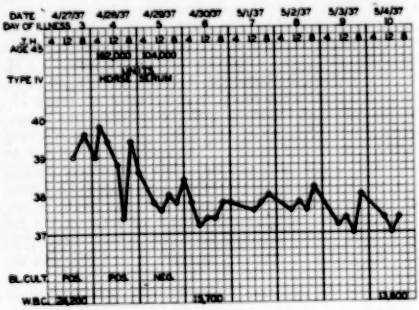


Chart 1.—Temperature curve, result of blood culture, and leukocyte count, case 1.

control programs—supplying antipneumococcus serum, establishing pneumococcus typing stations and promoting extensive educational projects. It can be said that pneumonia has entered the sphere of public health medicine, and it is hoped that public health methods will be as effective in controlling this disease as they have been with such infections as diphtheria, typhoid fever and tuberculosis.

The Massachusetts state, New York city and New York state pneumonia control services have already published the results of some of their studies. The New York city [9] and the Massachusetts state [10] services have

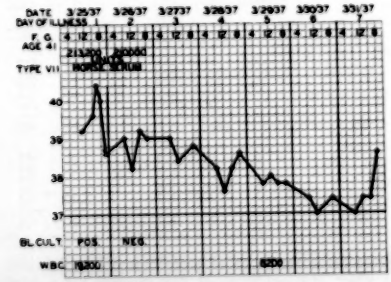


Chart 2.—Temperature curve, result of blood culture, and leukocyte count, case 2.

presented figures showing the distribution of the thirty-two types of pneumococcus in the sputums studied. The cases reported are of pneumonia as well as of suspected pneumonia, and they show an even larger incidence of the higher types, particularly types IV, V, VII, VIII, XIV and XIX. It should be pointed out that the incidence will be higher in such a study when the carrier types, such as types III, VI, VIII and XIX, are included than when only proved pneumonias are studied.

Although the total number of cases in our study is impressive, when the cases in which serum was used are distributed through the different types, no group is large enough to permit us to draw any definite conclusions. The statistical results for types IV, V, VII and VIII compared closely enough with the results in similar series to be significant. Certainly enough cases of serum-treated pneumonia of types V, VII and VIII can now be collected from the literature to show that the mortality rates for these types can be definitely reduced. Collected cases of type IV and type XIV pneumonia show only suggestive figures. As far as the remaining higher types are concerned, so few patients have been treated with serum that a statement as to the effect on fatality rates cannot be made. However, since the introduction of rabbit serum quite a number of the whole group of patients have been treated and the impression gained so far is that most types of pneu-

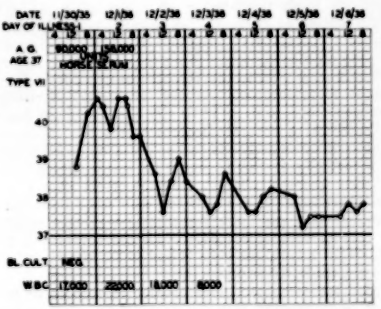


Chart 3.—Temperature curve, result of blood culture, and leukocyte count, case 3.

monia respond to serum. Certainly, the large experience with serum in the treatment of the most frequent types, together with the extensive experimental background, would lead one to predict that favorable results will be obtained with all types for which a potent serum can be produced.

Postoperative pneumonia in the past has been differentiated from so-called medical pneumonia. It has been considered "atypical pneumonia" or "group IV pneumonitis" and usually has been treated without bacteriologic study. It is true that in many cases it runs a mild course, but it is also true that postoperative pneumonia has a rather high fatality figure. With the thirty diagnostic serums it is now possible to discover the specific infecting organism in many cases. The prompt use of serum, it seems certain, will save lives and will also shorten the course and lessen the severity of the complication. Chart 6 shows an excellent clinical response with rabbit antipneumococcus serum of type XVII in a young woman in whom acute pneumonia developed after appendectomy.

The importance of type III pneumonia and the interest in the serum treatment of this very fatal disease seem

9. City of New York Department of Health Quarterly Bulletin 6: 58-60 (No. 2) 1938.
10. The Commonwealth, Boston, Massachusetts Department of Health, 1938.

to justify a brief report of our limited experience with rabbit antipneumococcus serum of type III. Because of the severe reactions produced by the concentrated product, it was not possible to make any sort of a trial until recently, when it finally became possible to refine and concentrate rabbit serum so that only occasional reactions occurred and a highly potent product could be utilized.

We have treated nine patients with type III concentrated rabbit serum, the last six having had no untoward reactions. Of the nine, three died and six recovered. Of those who recovered, one had a positive blood culture when serum treatment was instituted. Three were treated very early in the course of the disease and showed prompt response to a large unitage of serum. Chart 7 shows the course of an elderly patient, with definite signs and with an unfavorable outlook at the onset, who responded promptly to very early treatment with serum. Our experience is too meager to indicate any positive conclusions. However, our most recent results, together with the report of MacLeod and his associates,[11] who at the Rockefeller Institute Hospital have now treated fourteen patients with type III pneumonia with four deaths, lead us to hope that with a serum high in antibody, given shortly after the onset, there will be definite favorable response.

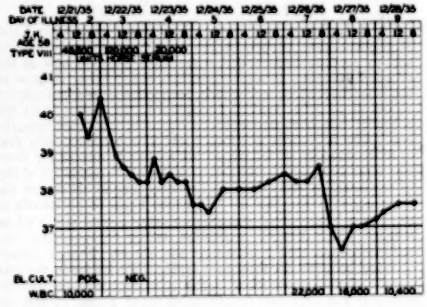


Chart 4.—Temperature curve, result of blood culture, and leukocyte count, case 4.

Antipneumococcus rabbit serum has taken the focus of attention recently, but whether rabbit serum, unit for unit, is more effective than horse serum remains to be proved. Certainly with rabbit serum it is possible to obtain a preparation high in antibody against type III pneumococcus and against a few of the rare types for which no potent serum was possible with the horse product. Furthermore, it is possible to prepare rabbit serum against the rarer types more economically. However, with the types for which a potent horse serum has been available, in our experience the response with it has been just as satisfactory as that with the rabbit product. Early treatment shows striking results with both. Horsfall and his colleagues [12] at the Rockefeller Institute, in their most recent report on the use of rabbit antipneumococcus serum, presented fifty-four cases of nine types, excluding type III, with a mortality rate of 3.7 per cent. Bennett [13] recently reported 100 cases of pneumonia of five types, not including type III, treated with rabbit serum, with a mortality rate of 7 per cent. Both of these reports are extremely encouraging but are based on a comparatively small series of cases. It is too early therefore to formulate any opinion as to the relative efficiency of the two serums.

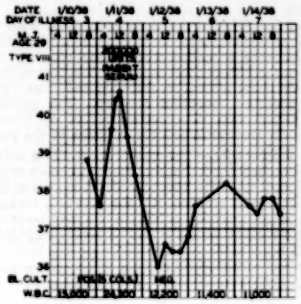


Chart 5.—Temperature curve, result of blood culture, and leukocyte count, case 5.

SUMMARY AND CONCLUSIONS

Pneumonia of the higher types is an important part of the pneumonia problem. In a collected series of 6,545 cases of pneumococcic pneumonia, over 50 per cent of the cases were of the higher types, 30 per cent being of types IV, V, VII, VIII and XIV.

Antipneumococcus serum was used in 111 cases, with a rather marked clinical response and an appreciable effect on the mortality rate for the combined series of cases of pneumonia of types IV, V, VII, VIII and XIV. At present there are available refined and concentrated preparations of horse and of rabbit serum that are high in antibody content and almost entirely free from reaction-causing substance. With such products the prospects are excellent for obtaining increasingly better results in the treatment of all types of pneumococcic pneumonia.

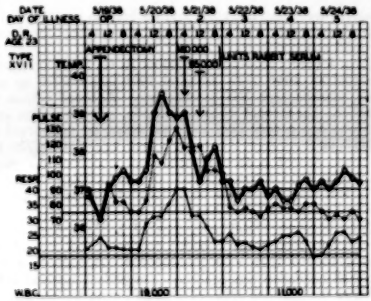


Chart 6.—Curves for temperature, pulse rate, respiratory rate and leukocyte count, case 6.

11. MacLeod, Colin M.: Report Given Before the American College of Physicians in New York City in April 1938.

12. Horsfall, Frank L., Jr.; Goodner, Kenneth, and MacLeod, Colin M.: Antipneumococcus Rabbit Serum as a Therapeutic Agent in Lobar Pneumonia: II. Additional Observations in Pneumococcus Pneumonias of Nine Different Types, New York State J. Med. **38**: 248-255 (Feb. 15) 1938.

13. Bennett, Richard H.: To be published.

REPORT OF CASES

CASE 1 (chart 1).—The sputum of J. H., a woman aged 45, admitted to New York Hospital on the third day of her illness, showed type IV pneumococci. Blood taken on admission showed a positive culture in the broth and a negative culture on the agar plate. On the day following admission, before treatment with serum was instituted, the blood culture was again positive. On that day, the fourth day of illness, after the routine tests for sensitivity, 192,000 units of concentrated type IV horse serum was administered intravenously. Early the following day 104,000 units of the same preparation was given. A total of 296,000 units was given in a twenty-eight hour period in seven injections without any reaction. The blood culture on the fifth day was negative. The temperature dropped to slightly above normal on that day, and from that time the patient made an uneventful recovery. This patient received nearly 300,000 units of serum because of the severity of the toxemia, the bacteremia and the tardiness of the treatment.

CASE 2 (chart 2).—The sputum of F. G., a man aged 41, admitted to New York Hospital seventeen hours after an acute onset, showed type VII pneumococci. A culture of blood taken on admission was positive. On the first day, because of particularly severe toxemia and because of almost complete involvement of the right lung, the patient received 213,200 units of type VII horse antibody. The following day, because the temperature was still elevated and the blood culture was reported positive, 210,000 units more was administered. After this

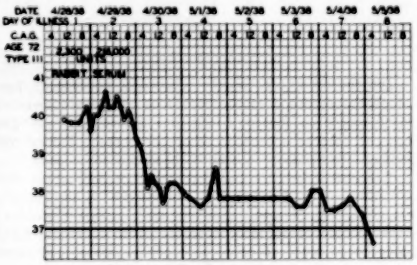


Chart 7.—Temperature curve, case 7.

intensive treatment the blood culture became negative and the toxemia subsided. The convalescence was uncomplicated except for mild serum sickness.

CASE 3 (chart 3).—The sputum of A. G., a woman aged 37, admitted to New York Hospital four hours after an acute onset, showed type VII pneumococci. A blood culture was negative. On account of acute toxemia, extensive signs in the left lung and a very high leukocyte count on the second day, 240,000 units of type VII horse serum was given. The temperature showed a critical drop, and recovery was prompt except for mild serum sickness. Since treatment was begun early and the disease was uncomplicated, the patient probably received more serum than was necessary.

CASE 4 (chart 4).—The sputum of J. K., a man aged 58, admitted to New York Hospital on the second day of acute illness, showed type VIII pneumococci. A culture of blood taken on admission was positive. The patient received 188,800 units of concentrated type VIII horse serum within thirty-six hours. There were no immediate reactions. The toxemia subsided promptly. The convalescence was uncomplicated except for serum sickness, which became acute on the seventh day, causing a temporary elevation in temperature and leukocyte count.

CASE 5 (chart 5).—The sputum of M. J., a man aged 29, admitted to New York Hospital on the third day of acute illness, showed type VIII pneumococci. Blood taken on admission showed a positive culture in the broth and showed five colonies on the plate. The patient was treated on the fourth day with 200,000 units of rabbit serum. Moderate chills occurred after three of the eight injections. The abrupt drop in the temperature was probably accentuated by the thermal reaction to the serum. The blood culture was sterile on the day after the serum was given. The convalescence was rapid.

CASE 6[14] (chart 6).—D. R., a woman aged 23, showed symptoms of pneumonia twenty-four hours after appendectomy. She had signs of consolidation of the left lower lobe and a leukocyte count of 19,000. The sputum showed a pure culture of type XVII pneumococci. Treatment with concentrated rabbit antipneumococcus serum of type XVII was instituted six hours after the onset of acute respiratory symptoms. The patient received 255,000 units intravenously within twelve hours without any untoward reactions. The temperature and the pulse and respiratory rates dropped promptly. The recovery from pneumonia was rapid. A large amount of serum was given on account of the preceding operation and the acute toxemia and because this was our first experience with type XVII serum.

CASE 7[15] (chart 7).—The sputum of C. A. G., a man aged 72, showed type III pneumococci. Signs of consolidation of the right lower lobe developed. Treatment with type III concentrated rabbit serum was instituted twelve hours after onset, and 218,300 units was given in a twenty-four hour period in six injections without any reactions. The temperature dropped, and the symptoms of toxemia subsided promptly.

ABSTRACT OF DISCUSSION

DR. E. L. BORTZ, Philadelphia: The treatment of types I and II pneumococcus pneumonia has proved the value of specific therapy so completely that it is generally accepted now as the standard procedure by all investigators in this field. Because of the importance of early diagnosis, pneumonia should be regarded as one of the great medical emergencies. In Pennsylvania the mortality rate from pneumonia is ten times that from appendicitis. The prevalence of types I and II caused attention first to be centered on these. Now that specific treatment for these two types has proved effective, it is logical to study its utility in the so-called rarer forms. The only way to determine the frequency of occurrence of the various types of pneumonia is to make a bacteriologic diagnosis on every patient suspected or afflicted. The Neufeld method of typing is so simple that technicians can readily determine the disease. Indeed, interns in many hospitals do their own typing. To ascertain the frequency of occurrence of all types it is necessary to test the specimen not only for organisms of types I and II but for organisms of the other twenty-eight types as well. Cooperation of doctors and health authorities is essential if pneumonia is to be brought under control. The nature of the problem lends itself to an approach on a broad geographic plan. In Pennsylvania 131 typing centers have been set up by Dr. Edith McBride Dexter, state secretary of health, where diagnostic facilities are available to doctors twenty-four hours a day. We hope to find out much about the various types of pneumococci, especially as to their occurrence. Then we want to watch their fluctuations from time to time. The treatment of the higher types will adjust itself along established lines. In Pennsylvania, serum treatment for types I, II, V, VII, VIII and XIV is beyond the experimental stage; we have therefore made these type serums available to every doctor in the state. But before he can get the serum he must first have made a bacteriologic examination. Through the generous assistance of one of the large pharmaceutic houses, treatment serums for other types has been furnished to certain clinicians in Pennsylvania for further investigation. It appears that except for type III, and even with this type in patients under 45 years of age, specific serum therapy gives some success in treating the rarer types.

DR. BYRON F. FRANCIS, Seattle: Dr. Plummer's paper is important. We who work in smaller places must depend on such controlled statistical studies in order to evaluate the effectiveness of any therapeutic procedure. However, if the physicians and hospitals of smaller communities were organized

14. Permission to report this case was given by Dr. W. H. Lohman, Brooklyn.
15. Permission to report this case was given by Dr. S. A. Garlan, New York.

to pool their individual experiences it might be possible to compile useful information of this sort. Clinical impressions are likely to be unreliable. The idea has prevailed that pneumonia is a relatively benign disease in the Pacific Coast region and that lobar pneumonia takes an atypical course. However, the few available series from this region which have been studied do not confirm this impression. When the course of pneumococcic pneumonia is carefully studied clinically and roentgenologically in a large number of cases, one finds that a great percentage do not conform to the classic picture of lobar pneumonia. The disease apparently takes a greater variety of clinical forms than was previously realized. The pneumonias should be classified on a bacteriologic and immunologic basis rather than according to the anatomic form. Correct typing is important but sometimes difficult, especially when material for typing is scanty. The typing should be checked frequently, especially if the expected response to serum is not obtained or the first reaction reveals one of the so-called carrier types. The agglutination test has been useful for determining when the administration of serum should be discontinued. If a positive agglutination test is obtained with undiluted serum, one may assume that an overabundance of antibodies is present.

DR. PHILIP G. CORLISS, Somerton, Ariz.: I practice in a small town near Yuma, Ariz., and am probably representative of the physicians of the small towns. We work under a disadvantage because the people are poor. It is an agricultural community, and the serum is very expensive. In the past two years I have treated every case with serum and have not lost a case. My experience with the higher types has been limited almost exclusively to type VII. I want to ask a question as to the amount of serum to be given in a case. Dr. Blankenhorn stated that he never gave more than 200,000 or 300,000 units. I had a case of type VII which I believe we would have lost if we stopped at 300,000. We pulled the patient through with 420,000. I want to ask Dr. Plummer about mixed infections. He has not mentioned any cases of mixed types. I have had two cases of type VII. In one case, type VII and type I pneumococci were found; in the other case of type VII also type II pneumococci was found. Both responded favorably to the serum.

DR. WILLIAM C. BRUFF, Whittier, Calif.: In the Los Angeles General Hospital we have been using serum for several years. I wish to make one point with regard to the use of the agglutination test as a test of adequate treatment. My impression is that we might as well throw that test out. We have seen, in spite of the presence of complete agglutination, the disease spread to new lobes and the patient go downhill and die. We have repeatedly seen good recovery, clinically, in the absence of any agglutination. I think one is much safer to follow the clinical signs and continue the serum until there has been a good drop in pulse and temperature or until one has exhausted one's resources of serum and have given up. I should like to ask what the author considers the limit of serum dosage in late and unfavorable cases. How far would he go in giving serum?

DR. NORMAN H. PLUMMER, New York: Since pneumonia has entered the field of public health medicine, a great deal has been accomplished. The cost of serum has always presented a serious problem. Now serum is being furnished by some of the states, making it possible to treat the patients with adequate amounts. In the states of New York and Massachusetts, comprehensive pneumonia control programs have been established. A question was asked regarding the dosage of serum in pneumonia. I agree that the clinical course is still the best guide to dosage. I have used both the slide agglutination test described by Sabin and the carbohydrate cutaneous test of Francis. Of the two, the Francis test has been found to be more satisfactory. Regarding the question of complications: In my experience complications have occurred with about the same relative incidence in the cases treated with serum as in the cases treated without serum. A mixed pneumococic infection is occasionally discovered. Such a case usually shows one of the carrier types in addition to the infecting type. For example, if sputum shows type I and type VIII pneumococci, it can be assumed that the type I is the infecting organism and that the type VIII is a carrier organism. The actual infection may be caused by more than one type, but the usual relationship of these organisms is the one already cited. In the cases of type III pneumonia presented in my paper, serum alone was used. In a smaller number of cases in which sulfanilamide alone was used, it was not possible to note beneficial clinical effect. Since seeing Dr. Osgood's demonstration of the bone-marrow culture medium, in which the combination of specific serum and sulfanilamide has such a striking effect on the pneumococcus, I am anxious to determine what clinical effect this combination will have. The following question has been asked: Some of the thoracic surgeons are treating pneumonia by position, sometimes standing the patient on his head, sometimes laying him on one side and then on the other, and sometimes changing his position three or four times daily. They claim that almost all pneumonias are due to a collapse of the lobe of the lung. Do you use the positions? In reply I would say No, I do not emphasize posture. My experience with postoperative pneumonia has indicated that most cases are cases of pneumococcic pneumonia and that they should be given the benefit of serum. I do not entirely subscribe to the idea that they are cases of atelectasis. They should be treated as pneumonia.

Clinical Notes, Suggestions and New Instruments

TRAUMATIC APPENDICITIS

C. M. BURGESS, M.D., HONOLULU, HAWAII

It is generally conceded, at least by industrial surgeons and insurance companies, that appendicitis of traumatic origin is a disease entity. Of course it is impossible to prove in the laboratory or by any other means that in a certain case acute appendicitis is traumatic in origin. However, in going over closely the history and clinical course of many cases reported in the literature as instances of traumatic appendicitis, one must admit that coincidence alone would be overtaxed to explain the phenomenon.

This case is not reported with the intention of either supporting or denying the existence of traumatic appendicitis. Most authorities will admit that trauma may be a contributing factor in the production of acute appendicitis in a previously diseased appendix. Since no organ in the body is immune to injury, no matter how deeply seated, it is not logical to say that appendicitis on a traumatic basis cannot occur in a previously normal appendix.

No attempt will be made in this report to review the literature on traumatic appendicitis. That has been so ably done recently by Maes and McFetridge [1] and by Shutkin and Wetzler [2] that further comment would be repetition. However, reading of the literature makes one thing apparent. For the cases reported as instances of traumatic appendicitis the mortality rate is extremely high. In Kelly's [3] series of fifty cases it was 50 per cent; thirty-seven of the appendixes had ruptured or were gangrenous. In sixteen of the twenty-five fatal cases appendical involvement was unrecognized. In all subsequent series of cases the proportion is about the same.

Traumatic appendicitis is so rare that no one has a large series or becomes proficient in its care. But by physicians bearing the possibility of its existence in mind perhaps the mortality and morbidity of the disease process can be lessened.

The mechanism of traumatic appendicitis has not been satisfactorily explained. Gangrene and rupture predominate as a pathologic process, but no differentiation can be made from stained sections. The diagnosis must be made from the history and clinical course. The weight of opinion would indicate that the condition is due to a sudden change in intra-abdominal pressure which causes an influx of cecal contents past a narrowed

1. Maes, Urban, and McFetridge, R. M.: Traumatic Appendicitis, Am. J. Surg. **30**: 478-482 (Dec.) 1935.
2. Shutkin, M. W., and Wetzler, S. H.: Traumatic Appendicitis, Am. J. Surg. **31**: 514-520 (March) 1936.
3. Kelly, H. A., and Hurdon, E.: Vermiform Appendix and Its Diseases, Philadelphia, W. B. Saunders Company, 1905.

portion of the appendical lumen. The distention and subsequent edema cause complete obstruction. Ultimate destruction results from rapid bacterial growth.

The patient, a man aged 46, a Hawaiian, was first seen about 10 a. m. May 21, 1937. Physical examination revealed that he was very well developed and well nourished and apparently in considerable pain. The right lower quadrant was extremely tender and rigid. The temperature was 101 F., the pulse rate 88 and the respiratory rate 23. The white blood cell count was 22,000, with 88 per cent polymorphonuclears. A diagnosis of acute appendicitis was made, and at operation a ruptured appendix found. The history is of great interest. For the previous two weeks the patient had been using a pneumatic drill to raise the ceiling of a tunnel through stone. This drill was suspended from the ceiling by means of a strap. To exert pressure he rested the butt of the drill in his right iliac fossa. About 10 a. m. May 20, 1937, while drilling, he suddenly had a pain in the right lower quadrant so severe that it doubled him up and prostrated him on the floor. This lasted several minutes, and, although it then became less severe, it prevented further use of the drill in the former position. A dull pain persisted until the next morning, when at work it became so severe that he was sent to a physician. There was no previous history of pain in the right lower quadrant.

The observations at operation were unusual. The cecum was attached unusually far toward the midline. The appendix was ruptured in such a way that the tip was amputated. It lay to the right of the cecum, sharply kinked upward at the base and directly over the psoas muscle. It was tightly bound to the posterior part of the parietal peritoneum by old tough adhesions at the region of the sharp kink upward. The peritoneum was drained. Convalescence was uneventful. Compensation was allowed.

This case seems to fulfil all the requirements necessary for the diagnosis of traumatic appendicitis. It is presented because of its rarity and because physicians cannot keep too much in mind a condition so high in mortality and morbidity.

881 Young Street.

INDUCED MALARIA IN A PATIENT WITHOUT A SPLEEN

REPORT OF A CASE

G. S. Ingalls, M.D., Cincinnati

A patient was referred to the Cincinnati General Hospital for treatment of dementia paralytica with malaria. Familial hemolytic jaundice was a coexisting disease, which complicated the usual procedure. The existing moderately severe anemia was a contraindication to immediate inoculation with malaria. Splenectomy was therefore considered proper, so that the factor responsible for the excessive destruction of red blood cells could be removed.

The constant finding of splenomegaly in malaria suggested that some change might result in the reaction to malaria if the spleen were absent.

A review of the literature elicited no account of the course of this disease in a splenectomized subject. It was decided, therefore, to make certain clinical and laboratory observations on the course of induced malaria in this patient after splenectomy.

REPORT OF CASE

History.—D. H., a native-born American woman aged 31, a housewife, was admitted to the hospital July 23, 1937, after convulsions and transient attacks of hemiplegia.

The patient was in good health until 1933, when her skin became pale and faintly yellow. She lost strength and weight and was bedridden when a physician was called. His examination revealed a moderately enlarged spleen, 1,110,000 red blood cells, slightly increased fragility of the red cells and a strongly positive Wassermann reaction of the blood. Arsenical therapy for syphilis caused nausea and vomiting. The patient had been given approximately 500 intramuscular injections of a soluble bismuth preparation during a three year period previous to her admission to this hospital. On Jan. 1, 1937, the patient began having epileptiform convulsions, followed by hemiplegia and aphasia lasting from two to three weeks. Potassium iodide and a bismuth compound were given rigorously during these episodes. Several similar attacks occurred before admission, and the last one was associated with increased jaundice. The patient's only complaint on entering the hospital was of a vague epigastric discomfort. Her mother and brother have familial hemolytic jaundice.

Examination.—On admission the patient was fairly well developed and nourished, anemic and not acutely ill. The temperature was 100.6 F., the pulse rate 106 and the respiratory rate 26. The blood pressure was 120 systolic, 68 diastolic. She weighed 96 pounds (43.5 Kg.). The scleras were slightly icteric. The pupils were regular and equal and responded actively to light and in accommodation. There were fine tremors of the lips and tongue. The speech was slurred and dysarthric. A firm, rounded, nontender spleen extended 6 cm. below the left costal margin. On deep inspiration the liver edge descended 4 cm. below the right costal margin. Soft, discrete, freely movable lymph glands the size of small peas were palpated in the groins, axillas and epitrochlear fossae. There were hyperactive deep reflexes and positive Hoffmann and Babinski signs bilaterally.

Laboratory examinations revealed a hemoglobin content of 60 per cent, 2,760,000 red blood cells, 9,500 white blood cells; neutrophils 74 per cent, lymphocytes 23 per cent, eosinophils 1 per cent, monocytes 2 per cent and reticulocytes 2.2 per cent. The bleeding time was two minutes and the clotting time five minutes. Clot retraction was complete within two hours. The fragility test of the red blood cells revealed that hemolysis began at 0.42 per cent saline and was complete at 0.34 per cent saline. The icteric index was 17.5. Total serum protein was 7.1 Gm. per hundred cubic centimeters. The blood uric acid was 4.2 mg. per hundred cubic centimeters. The Wassermann reaction of the blood was strongly positive. The cerebrospinal fluid was clear and colorless, was under 120 mm. pressure, gave a 2 plus Pandy reaction, showed 15 lymphocytes per cubic millimeter and gave a strongly positive Wassermann reaction and a colloidal gold curve of 5555543200. Urinalyses and stool examinations gave essentially negative results.

Mental Status: Friends and relatives had noticed no personality change. The patient was well kept and neat and spoke coherently. Her attention was easily held and she cooperated well. The dominant mood was cheerfulness, but she was unstable emotionally and cried easily. There were no delusions, illusions or hallucinations. Her fund of information, ability to calculate and judgment were moderately impaired. Memory for recent events was slightly defective. Her sexual desire was diminished.

A diagnosis of dementia paralytica and familial hemolytic jaundice was made. The patient was given a general diet and iron and ammonium citrates, 1 drachm (4 Gm.) three times a day. At the end of the second week the red blood cells had risen to 3,700,000. She was transferred to the surgical service and there was given 500 cc. of citrated blood intravenously before splenectomy was done. Operation and convalescence were uneventful.

After her return to the psychiatric ward her physical condition steadily improved. The fragility test revealed that hemolysis began at 0.55 per cent saline and was complete at 0.32 per cent saline. Serum carbon dioxide was 58.5 volumes per cent. Serum chlorides were 100.5 millequivalents per liter. Whole blood inorganic phosphorus was 4 mg. per hundred cubic centimeters. The patient received intravenous and intramuscular injections of blood from a patient with benign tertian malaria. Two days later the temperature, pulse rate and respiratory rate rose sharply to 102 F., 128 and 26, respectively. These elevations persisted, the values reaching 105.4 F., 134 and 30 before returning to normal at the end of seven days. Three days later a similar episode occurred, lasting five days. The temperature, pulse rate and respiratory rate reached 103.4 F., 120 and 30 and gradually fell to 99 F., 88 and 24. The white blood cells varied between 8,200 and 11,200. Urinalyses gave

From the Psychiatric Department, Cincinnati General Hospital.

negative results. Blood culture was negative. The Widal test was negative. Agglutination with Bacillus melitensis was negative. The Weil-Felix reaction was positive in a dilution of 1:320 and remained so during the patient's course in the hospital.

The patient had no complaints, and her physical condition was clinically unchanged from that on admission. On the sixteenth day after inoculation she began having paroxysms of chills and fever. A characteristic chill would be anticipated by the patient about one hour before its climax. She complained of malaise, chilliness and shivering. These merged into severe rigors and trembling. Her skin became ashen and her lips and nail beds cyanotic. The blood pressure was 100/80 and fell to 90/60 at the end of the chill. The pulse was rapid, full and bounding. The chills lasted from thirty to fifty minutes and were followed by a temperature, pulse rate and respiratory rate of 104.6 F., 120 and 24, which levels were maintained for from four to five hours, falling gradually to 99.2 F., 100 and 26 at the end of twelve hours. Plasmodium vivax was identified in the blood stream on the third day after the first chill.

At the height of the third chill, the following laboratory observations were noted: icteric index 18, blood sugar 79 mg. per hundred cubic centimeters, serum protein 5.7 Gm., urea nitrogen 15 mg., serum chlorides 98 milliequivalents per liter, serum carbon dioxide 57 volumes per cent, reticulocytes 4.2 per cent, red blood cells 3,660,000, whole blood inorganic phosphorus 3.4 mg. per hundred cubic centimeters and serum cholesterol 92 mg.

The paroxysms of chills and fever occurred daily, and the patient became listless and apathetic. She lost her appetite, perspired profusely during the defervescence of fever and was occasionally incontinent of urine. On the day of the sixth chill the patient was weak, her skin was pale and icteric and she complained bitterly of the increasingly severe rigors. The pulse was rapid and of small volume. The liver extended 4 cm. below the costal margin and the lymph glands were soft, nontender and discrete and enlarged to the size of beans. Red blood cells numbered 3,220,000, hemoglobin content was 65 per cent, white blood cells numbered 17,150: neutrophils 44 per cent, lymphocytes 32 per cent, monocytes 4 per cent. The icteric index was 18. Urinalysis gave negative results. She was given quinine sulfate, 15 grains (1 Gm.) every four hours for three doses, then 10 grains (0.65 Gm.) daily for sixteen days, together with reduced iron 10 grains three times a day. The chills stopped immediately. The parasites disappeared from the blood stream within three days, the liver edge receded to the rib margin and the lymph glands became smaller and firm. She no longer complained of the extreme feeling of weakness and helplessness present during the course of the chills. After six days of antimalaria therapy, the red blood cells dropped to 2,450,000 and the white blood cells rose to 18,150; neutrophils 38 per cent, lymphocytes 55 per cent, monocytes 4 per cent, eosinophils 2 per cent, and basophils 1 per cent. During the next eighteen days the blood picture rapidly changed to red cells 3,850,000, white cells 9,550, neutrophils 55 per cent, lymphocytes 41 per cent, monocytes 2 per cent, basophils 1 per cent, and reticulocytes 0.8 per cent. Serum cholesterol had risen to 138 mg. per hundred cubic centimeters, and blood sugar to 83 mg.; the urea nitrogen was 8 mg.

The patient gained weight and strength. Her emotional state was stable and cheerful and her responses were spontaneous. She could calculate with greater ease and accuracy, although her judgment remained somewhat impaired.

Injections of tryparsamide and bismuth salicylate were begun, and the patient was discharged one month after the onset of chills.

SUMMARY AND CONCLUSIONS

In general, with the exception of the occurrence of the early sustained fever, this patient reacted as does the usual patient with malaria. Interesting features in our case were:

1. Generalized lymphadenopathy, enlarged liver and absolute lymphocytosis during the course of paroxysms of chills and fever.

2. Failure of the blood sugar level to drop during a paroxysm.

3. A low blood cholesterol level during the paroxysms.

4. Prompt response of the malarial infection to quinine.

5. Atypical febrile episodes occurring before the onset of chills and the appearance of parasites in the blood stream.

6. A positive Weil-Felix reaction in high dilution.

7. The laboratory observations are presented without an attempt to interpret them.

This patient's course suggests that:

1. The absence of the spleen is no contraindication to the treatment of dementia paralytica with malaria.

2. It is probable that in cases of malaria in which the spleen is absent the lymphatic system compensates for whatever function that organ may have.

TRICHINOSIS: REPORT OF TRICHINAE IN VOCAL CORDS OF A PATIENT WITH DIPHTHERIA

ARCHIBALD L. HOYNE, M.D., AND A. A. WOLF, M.D., CHICAGO

From the literature it is evident that trichinosis occurs much more frequently than is generally supposed. It has been reported that on routine postmortem examination of several thousand diaphragms an incidence of trichinosis was found varying in different series from 13.6 per cent [1] to 17.5 per cent [2] and even as high as 28 per cent.[3] Some believe the explanation for these figures lies in the fact that from 3 to 6 per cent of hogs are infected with trichinae.[4]

Trichinella spiralis belongs to the family of Nemathelminthes or roundworms and enters the human body in raw or inadequately cooked pork. The gastric juices dissolve the protective capsule of the larvae and free the worm, allowing the latter to pass into the small intestine, where coitus occurs. The female then burrows under the surface of the intestinal mucosa and deposits viviparous young in the lymphatic and vascular structures.[5] The larvae arrive at their destination in about nine days and encyst when they reach striped muscle. The capsule alone or the capsule and worm may then become calcified.[6]

Trichinae have been found in the spinal fluid,[7] mesenteric lymph nodes, lungs, heart, pancreas,[8] brain,[9] gallbladder,[10] placenta, milk of nursing mothers, pleural effusion and retina.

The symptoms produced follow the cycle of the worm:

1. Period of invasion of host or that period wherein the worms develop to maturity in the intestine. Gastrointestinal manifestations such as nausea, vomiting, diarrhea and abdominal pain occur at the end of the first week.

2. Period of dissemination of larvae or that period when the larvae are carried into the blood stream and lymphatics to become embedded in the striped muscle. There occurs then muscle tenderness, edema about the eyes and eosinophilia, this being at the end of the second week.

3. Period of encystment, which is the convalescent period in mild cases but in overwhelming infections marked edema of the face, severe cachexia, delirium and coma are produced.

From the Contagious Disease and Pediatric departments, Cook County Hospital.

1. Hall, M. C., and Collins, D. J.: Incidence of Trichinosis as Indicated by Postmortem Examination of 300 Diaphragms, Pub. Health Rep. **52**: 468-490 (April 16) 1937; Some Correlations and Implications in Connection with the Incidence of Trichinae Found in 300 Diaphragms, ibid. **52**: 512-527 (April 23) 1937.

2. Queen, F. B.: The Prevalence of Human Infections with Trichinella Spiralis, J. Parasitol. **18**: 128 (Dec.) 1931.

3. Riley, W. A., and Scheifley, C. H.: Trichinosis of Man a Common Infection, J. A. M. A. **102**: 1217-1218 (April 14) 1934.

4. Magath, T. B.: Encysted Trichinae, J. A. M. A. **108**: 1964-1967 (June 5) 1937. Hall, M. C.: The Complex Clinical Picture of Trichinosis and the Diagnosis of the Disease, Pub. Health Rep. **52**: 539-551 (April 30) 1937.

5. Spink, W. W., and Augustine, D. L.: Diagnosis with Specific Reference to Skin and Precipitin Tests, J. A. M. A. **104**: 1801-1805 (May 18) 1935.

6. Faust, E. C.: Human Helminthology, Philadelphia, Lea & Febiger, 1929.

7. Van Cott, J. M., and Lintz, William: Trichinosis, J. A. M. A. **62**: 680 (Feb. 28) 1914.

8. Frothingham, Channing: Lesions Caused by Trichina Spiralis in Man, J. M. Research **13**: 483, 1906.

9. Hassin, G. B., and Diamond, I. B.: Trichinosis Encephalitis, Arch. Neurol. & Psychiat. **15**: 34 (Jan.) 1936.

10. Horlick, S. S., and Bicknell, R. E.: Trichinosis with a Widespread Infestation of Many Tissues, New England J. Med. **201**: 816 (Oct. 24) 1929.

111
938

The cardinal points in diagnosis are (1) history of eating raw pork, underdone pork or pork products, (2) gastrointestinal disturbances, (3) eosinophilia, (4) edema, usually suborbital, (5) high fever, (6) myositis and (7) myalgia.

The means of establishing the diagnosis are (1) biopsy, (2) examinations of the stool, blood and cerebrospinal fluid, (3) precipitation test and (4) the intradermal test. Of these, the Bachman intradermal test has proved of considerable value. It consists of a dried extract of the larvae diluted in a buffered saline solution. It is an intradermal test using 0.1 cc. of a 1:10,000 dilution and is read in from five to twenty minutes. A positive reaction raises a wheal of at least 7 mm. in diameter and a zone of erythema not less than 20 mm. in diameter. In about 90 per cent of persons a positive reaction develops in from two to four weeks after the onset of infection.[11]

Trichinosis is uncommon in children because their gastric juices fail to dissolve the capsules of the larvae as occurs in adults. This explains why the larvae usually pass through the intestinal tract without causing infection and are excreted.

There have been recorded seventy-four cases of trichinosis in children, but we have found only three articles summarizing eleven cases in pediatric journals.[12] The clinical entity of

Trichinae in vocal cord (courtesy of R. H. Jaffé); reduced from a photomicrograph with a magnification of 100 diameters.

trichinosis has been regarded lightly in didactic considerations at medical schools and is seldom considered in a differential diagnosis in hospital wards for children.

Twenty years ago one of us observed a child about 3 years of age who was sent to the Contagious Disease Department of the Cook County Hospital with a diagnosis of epidemic meningitis. We found trichinae in the spinal fluid, a rare disclosure at that time. (This case was not reported.) Since then there has been no recognized case of trichinosis occurring in a child among patients in our contagious disease department until the one responsible for the following report:

REPORT OF CASE

History.—M. C., an infant Negress, aged 11 months, was admitted to the Cook County Hospital July 4, 1937. The family and social histories were unsatisfactory. It was said that there were other children living and well.

The child was a full term normal infant weighing 9 pounds (4,082 Gm.) at birth. She was artificially fed on whole boiled milk formula and received cod liver oil and orange juice. Development was normal, the baby having sat up at 5 months and walked at 10 months. There was no history of immunization or of contact with a patient with an infectious disease.

About five days before admission to the Cook County Hospital the mother noted that the child appeared to have a slight cold. Two days later there seemed to be fever, and on that account the mother decided to bring the patient to the hospital.

Examination.—On admission the infant was acutely ill. The rectal temperature was 103.6 F., the pulse rate 160 and the respiratory rate 60. The patient was listless and dyspneic and had a respiratory stridor.

A white membrane seemed to cover the mucous membranes of the nose. The pharynx was reddened and a white exudate concealed the left tonsil. A few submaxillary glands were palpable.

The boundaries of the heart were within normal limits with tones normal but rapid. Throughout the lung fields bilaterally were heard distinct breath sounds and coarse musical rales.

The abdomen and genitalia were normal and no pathologic neurologic reflexes were present.

Diagnostic Impressions and Possibilities.—The gradual onset of the disease, the age of the child (11 months), the history of no immunization and the presence of a membrane made probable a diagnosis of nasotonsillar laryngeal diphtheria. A streptococcic laryngotracheal bronchitis was also considered.

Clinical Course.—Intubation was done with a 1-2 year tube, which passed into the glottis with a sense of obstruction in the larynx. Because no relief was afforded, the tube was withdrawn and a 2-4 year tube inserted. Again no improvement was noted and a Mosher tube ("life saver") was introduced. However, the child was not benefited. Twenty thousand units of diphtheria antitoxin was administered intramuscularly. Epinephrine and caffeine with sodium benzoate were given and additional insertions of the Mosher tube were made, but the child's condition grew progressively worse and she died seven hours after entering the hospital.

Laboratory Studies.—Culture of material taken from the nose and throat for Klebs-Loeffler bacillus proved to be positive. Unfortunately no differential blood count was made.

The diagnosis made at necropsy was (1) pseudomembranous pharyngitis and laryngitis (diphtheritic), (2) trichinosis of the vocal cords, (3) parenchymatous degeneration of the myocardium and slight sclerosis of the endocardium of the left ventricle, (4) parenchymatous degeneration of the liver and kidneys, (5) focal bronchial pneumonia of the left lower pulmonary lobe and (6) moderate hyperplasia of the spleen.

Through the courtesy of the late Dr. Richard H. Jaffé, who performed the necropsy, we secured the accompanying photomicrograph. It shows a section of vocal cord in which trichinae are plainly visible.

COMMENT

We have reported this case for the following reasons: 1. As far as we know this is the first recorded instance of trichinae being found in the vocal cords. 2. Trichinosis occurs infrequently in children. 3. Diphtheria involving the larynx presented an unusual combination of conditions.

25 East Washington Street.

11. McCoy, O. R.; Miller, J. J., and Friedlander, R. D.: The Use of and Intradermal Test in the Diagnosis of Trichiniasis, J. Immunol. **24**: 1-23 (Jan.) 1933.

12. Sokel, I. P.: Sporadic Trichinosis in Children, Am. J. Dis. Child. **51**: 367-388 (Feb.) 1936. Carpenter, H. C.: Case of Trichinosis, Tr. Am. Pediat. Soc. **31**: 184, 1919. Gordon, M. B.; Cares, Reuben, and Kaufman, Benjamin: Myocarditis and Encephalitis in a Fatal Case of Trichinosis, J. Pediat. **6**: 667 (May) 1935.

The Birth of Aesculapius.—It was above Epidaurus, on Mount Titthion, as we have seen, that Aesculapius was born, the son of the god Apollo and a maiden named Coronis. According to one legend, the young mother left her baby in the care of a shepherd and went off with a mortal man, at which Apollo was angry and gave the little boy to the centaur Cheiron to bring up and educate as a physician. Soon the child became so expert in healing human ills that he even brought the dead to life. This so maddened Zeus and Pluto that they conspired to kill Aesculapius. Again Apollo saved him, and when he was of age he married Epione, by whom he had several children, all doctors. Homer merely mentions the sons of Aesculapius as healing the battle wounds at Troy, but his daughters' names, Hygeia and Panacea, have become household words for the prevention of sickness.—Hurd-Mead, Kate Campbell: A History of Women in Medicine, Haddam, Conn., the Haddam Press, 1938.

Special Article

THE HUMAN REQUIREMENT OF VITAMIN D

P. C. JEANS, M.D.
AND
GENEVIEVE STEARNS, PH.D.
IOWA CITY

This article and others recently published or to be published comprise a new series on the present status of our knowledge of the vitamins. They have been prepared under the general auspices of the Council on Pharmacy and Chemistry and the Council on Foods. The opinions expressed are those of the authors and not necessarily the opinions of either council. Reprints are not available but the articles will be published later in book form.—ED.

For many persons some vitamin D in addition to that ordinarily obtained by exposure to sunshine is necessary for the most efficient utilization of calcium and phosphorus. The vitamin acts by increasing the amounts of these substances available for the mineralization of bones and teeth. Measurement of the requirement of vitamin D presupposes the ingestion of a diet adequate in all other respects and particularly containing ample amounts of calcium and phosphorus; it should include also recognition that the human requirement of vitamin D (or of any other nutritional factor) includes both the quantity necessary to prevent obvious clinical pathologic changes and an amount which promotes a condition of normal nutrition and health.

The requirements of vitamin D may be defined as those amounts which, with ample intakes of calcium and phosphorus and a diet otherwise adequate, insure sufficient retention of calcium and phosphorus to permit (*a*) normal growth and mineralization of the skeleton and teeth of infants and children, (*b*) maintenance of bony and dental structures during adult life and (*c*) a sufficient supply for mother and infant during pregnancy and lactation.

Unfortunately no one yet knows the normal rate of growth of children. Instead, there are available only many average rates of growth under widely varying conditions of nutrition. It is known from studies of racial food habits that when the diet of a people is nutritionally good and includes a plethora of milk and ingested vitamin D or its equivalent in sunlight the people of that race are tall and well formed, with well calcified skeletons and freedom from dental caries.[1] On the other hand, peoples whose mineral or vitamin D intake is very low are small of stature and prone to be subject to rickets or osteomalacia.[2] Even in this country, children from better class homes are taller and heavier than children of poor families,[3] and children from better class homes of today are taller than those of the same class a generation or so ago.[4] One may postulate, therefore, that "average" rates of growth of today still represent suboptimal rather than optimal skeletal growth, so that, if linear growth is used as a criterion of adequacy of vitamin D intake, the rate should be at least "average."

During childhood and adolescence, not only does the skeleton grow in size but a part of its water content is replaced by inorganic salts. The rate of replacement is not known with certainty but is most rapid in early life. Because of the variability of standards of growth and mineralization of the skeleton, the optimal amounts of calcium and phosphorus to be retained at any age are not known. Various methods of calculating these requirements have appeared in the literature from time to time.[5] The required retentions estimated for calcium by the different investigators vary from 0.1 Gm. daily throughout childhood[5a] to a graded scale increasing from 0.3 Gm. daily at 1 year to 0.5 Gm. daily during adolescence.[5c] As improvement in nutrition has so far resulted in increased average stature, and as mineralization of the skeleton may lag far behind growth,[6] the higher figures are thought to be a safer guide.

The requirements of normal persons for only the ingested forms of vitamin D will be considered in the present discussion. The criteria commonly used are freedom from rickets or osteoporosis, good growth and development, normal values for serum calcium and phosphorus, ample retentions of these elements for growing individuals and "equilibrium" for those fully grown.

REQUIREMENT DURING INFANCY

Infants Fed Cow's Milk.—Studies of the vitamin D requirement during infancy may be divided into two groups. The larger group comprises studies planned to determine a minimal requirement using the prevention of rickets as the sole or chief criterion. Some of these include also the levels of serum calcium, phosphorus and phosphatase, and a few have taken into consideration the rates of growth. The smaller group comprises studies which include in addition to the preceding criteria quantitative determinations of the retention of calcium and phosphorus correlated with the rate of growth and the relative intakes of calcium and phosphorus. The emphasis in this group has been not on rickets prevention but on growth and development and on the fully adequate rather than the minimum requirement for vitamin D.

All these studies include periodic roentgen examination of the radius or tibia; in the first group of studies this constitutes the chief basis of judgment. Little agreement has been achieved in the interpretation of minor aberrations of growth at the epiphysial line,[7] but much greater uniformity in the determination of rickets of "clinical significance." Use of only the latter criterion is necessary if comparisons are to be made between the various studies. Rickets prevention alone probably should not be considered as a criterion of an adequate vitamin D supply. It is at least reasonable to think that the optimum amount of any nutri-

From the Department of Pediatrics, State University of Iowa College of Medicine.

1. McCarrison, R.: Problems of Nutrition in India, Nutrition Abstr. & Rev. **2**: 1 (July) 1932. Orr, J. B., and Gilkes, J. L.: Physique and Health of Two African Tribes, Medical Research Council, Special Report Series, No. 155, London, His Majesty's Stationery Office, 1931. Ehrström, R.: Die Diät- und Kostführung der nordischen Länder in historischer Beleuchtung, Acta med. Scandinav. **81**: 583 (fasc. V-VI) 1934.

2. Maxwell, J. P.: Osteomalacia and Diet, Nutrition Abstr. & Rev. **4**: 1 (July) 1934. Footnote 1.

3. Baldwin, B. T.: Physical Growth of Children from Birth to Maturity, University of Iowa Studies, Studies in Child Welfare I, No. 1, June 1921. Gray, Horace, and Fraley, Frederick: Growth Standards: Height, Chest-Girth and Weight for Private School Boys, Am. J. Dis. Child. **32**: 554 (Oct.) 1926.

4. Gray, Horace: Increase in Stature of American Boys in the Last Fifty Years, J. A. M. A. **88**: 908 (March 19) 1927.

5. (*a*) White House Conference Reports: Growth and Development of the Child: III. Nutrition, New York, the Century Company, 1932, p. 196. (*b*) Sherman, H. C., and Hawley, E.: Calcium and Phosphorus Metabolism in Childhood, J. Biol. Chem. **53**: 375 (Aug.) 1922. (*c*) Leitch, I.: The Determination of the Calcium Requirements of Man, Nutrition Abstr. & Rev. **6**: 553 (Jan.) 1937.

6. (*a*) Todd, T. W.: Personal communication to the authors. (*b*) Sherman, H. C., and Campbell, H. L.: Growth and Reproduction on Simplified Food Supply: IV. Improvement in Nutrition Resulting from an Increased Proportion of Milk in the Diet, J. Biol. Chem. **69**: 5 (May) 1924.

7. (*a*) Jeans, P. C.: Vitamin D Milk, J. A. M. A. **106**: 2066 (June 13), 2150 (June 20) 1936. (*b*) Cooley, T. B., and Reynolds, Lawrence: The Interpretation of X-Ray Films in the Diagnosis of Rickets, J. Pediat. **10**: 743 (June) 1937.

tional essential is somewhat greater than the amount which barely prevents clinical pathologic changes.

The determination of calcium and inorganic phosphorus of blood serum has a definite but limited usefulness in estimating the vitamin D requirement. In general, rickets cannot develop concurrently with a continuously normal level. The amounts of vitamin D that barely prevent rickets produce serum values within the range considered normal. However, values of this magnitude give little indication as to whether the calcium balance is weakly or strongly positive; it may even be negative. Perhaps one should distinguish between low and high normal levels. When the amount of vitamin D is considered fully adequate, the serum calcium and phosphorus levels then would be in the upper part of the normal range, whereas with amounts of vitamin D considered inadequate the serum values would be at the lower limits of normal.

The rate of growth is an important factor in determining the vitamin D requirement. Since rickets is a condition the severity of which tends to increase with increasing rates of growth, it is more important to prove that rickets has been prevented in a rapidly growing than in a slowly growing infant. Evidence is available also that the rate of growth is increased above the average when the intake of vitamin D is fully adequate.[8]

The most useful criterion of the vitamin D requirements is provided by studies of the utilization of calcium and phosphorus. Observations on the retention of these minerals permit a direct evaluation of the efficiency of utilization at different levels of vitamin D intake instead of the indirect estimates which have been discussed. This direct evaluation is the one procedure available which permits the estimation of an appropriate rather than a minimal requirement for vitamin D. Rickets prevention can be a criterion only in infancy, whereas the retained quantity of calcium and phosphorus offers a criterion for all age periods. Ample rather than minimal retention of calcium and phosphorus is required throughout the period of growth to supply material for new bone and for the replacement of water in bone already formed. Ample retention of these elements is desirable also to aid in compensating for the inevitable mineral losses in association with illness.

The consensus of various studies seems to be that the quantity of vitamin D received by a baby fed customary quantities of milk containing 135 units[9] to the quart is sufficient to prevent the development of rickets in the majority of full term infants but insufficient to prevent moderate or severe rickets in prematurely born infants; that from 300 to 400 units daily as cod liver oil or as milk containing 400 units to the quart allows sufficient vitamin D to prevent rickets of clinical significance in both full term and prematurely born infants.[10]

Early studies reported different normal standards for the serum calcium and phosphorus levels of breast-fed and artificially fed babies. Later studies showed that artificially fed infants given adequate vitamin D had serum values equaling those of infants given human milk.[11] When infants are fed milk containing 135 units of vitamin D to the quart, the serum calcium and phosphorus values are normal, but higher dosages of vitamin D (from 300 to 400 units) permit levels nearer the top of the normal range.[12]

It has been observed that infants given milk containing 135 units to the quart tend to grow at average rates, whereas infants given from 300 to 400 units of vitamin D tend to grow somewhat faster than the average.[8a] This observation has been corroborated recently.[8b]

Studies of calcium and phosphorus retention [13] have shown that infants given no additional vitamin D show marked variability in calcium retention with a low average. When from 60 to 135 units of vitamin D is given daily, the number of low retentions decreases, raising the average retention of the group. A further and significantly greater increase in average retention is obtained (by raising the lower limit of the retention range) when from 300 to 400 units of vitamin D is fed daily. Thus, increasing the vitamin D content of the diet from 0 to 300 or 400 units decreases variability of the infant in regard to ability to retain calcium and tends to raise all infants to the level of those most efficient in calcium retention. These studies show also that the calcium retentions observed when from 300 to 400 units of vitamin D is fed daily are accompanied by excellent dentition and the maintenance of serum calcium and phosphorus at high normal levels as well as by increased growth and development. The average retention observed when from 300 to 400 units of vitamin D is given apparently is ample to provide abundantly the nutritional needs for these minerals, even at the somewhat increased rate of skeletal growth observed.

Data are not available to show whether an amount of vitamin D between 135 and 300 units daily would be equally effective in permitting ample retention of calcium and phosphorus. Whatever the minimal level of vitamin D for good retention of these minerals, that level seems to be greater than 135 units.

A few observations indicate that amounts of vitamin D which are considerably in excess of 400 units daily may be detrimental when growth and retention are used as criteria. In an inpatient study, five infants given 1,500 or more units daily have shown decreased appetite accompanied by retardation of growth at or beyond 6 months of age. Decreasing the vitamin D intake of two of these infants has resulted in a greater food intake and an increased rate of growth.[14] Further study will be necessary before the significance of these observations can be evaluated.

Present knowledge of the relationship of vitamin D to growth helps to explain the occasional diagnosis of

8. (a) Stearns, Genevieve; Jeans, P. C., and Vandecar, Verva: The Effect of Vitamin D on Linear Growth in Infancy, J. Pediat. **9**:1 (July) 1936. (b) Slyker, F.; Hamil, B. M.; Poole, M. W.; Cooley, T. B., and Macy, Icie G.: Relationship Between Vitamin D Intake and Linear Growth in Infants, Proc. Soc. Exper. Biol. & Med. **37**:499 (Dec.) 1937.

9. All units mentioned in this review refer to U. S. P. XI units of vitamin D.

10. (a) Rapoport, Milton, and Stokes, Joseph, Jr.: II. The Antirachitic Value of Irradiated Evaporated Milk and Irradiated Whole Fluid Milk in Infants, J. Pediat. **8**:154 (Feb.) 1936. (b) Eliot, Martha M.; Nelson, E. M.; Barnes, D. J.; Browne, Florence A., and Jeans, Rachel M.: A Study of the Comparative Value of Cod Liver Oil, Viosterol and Vitamin D Milks in the Prevention of Rickets and of Certain Basic Factors Influencing their Efficacy, ibid. **8**:255 (Sept.) 1936. (c) Drake, T. G. H.; Tisdall, F. F., and Brown, Alan: Irradiated Evaporated Milk in the Prevention of Rickets, ibid. **8**:161 (Feb.) 1936; A Comparison of the Antirachitic Effect of Irradiated Cholesterol and Cod Liver Oil, ibid. **9**:421 (Oct.) 1936. (d) Davidson, L. T.; Merritt, Katharine K., and Chipman, S. S.: Prophylaxis of Rickets in Infants with Irradiated Evaporated Milk, Am. J. Dis. Child. **53**:1 (Jan., pt. 1) 1937; (e) Prophylaxis of Rickets in Infants with Vitamin D Milk, ibid. **51**:1 (Jan.) 1936. Jeans.[7a]

11. Stearns, Genevieve, and Warweg, Edna: Studies of Phosphorus of Blood: I. The Partition of Phosphorus in Whole Blood and Serum, the Serum Calcium and Plasma Phosphatase from Birth to Maturity, J. Biol. Chem. **102**:749 (Oct.) 1933.

12. (a) Jeans, P. C., and Stearns, Genevieve: The Retention of Calcium by Infants Fed Evaporated Milk Containing Cod Liver Oil Concentrate, Proc. Soc. Exper. Biol. & Med. **32**:1468 (June) 1935. (b) McQuarrie, Irvine; Thompson, W. H.; Stoesser, A. V., and Rigler, L. G.: The Antirachitic Potency of Ergosterol Activated by Low Velocity Electrons, J. Pediat. **10**:295 (March) 1937.

13. Stearns, Genevieve, and Jeans, P. C.: The Effect of the Quantity of Vitamin D Intake on Calcium Retention in Infancy, J. Biol. Chem. **114**:c (May) 1936.

14. Stearns, Genevieve, and Jeans, P. C.: Unpublished data.

rickets by roentgenographic means when rickets probably is not present. The small changes used as criteria in the roentgenographic diagnosis of slight rickets occur when no vitamin D is given and tend ultimately to increase, producing the picture of clinical rickets. When from 60 to 135 units of vitamin D is given daily, a minimum number of these changes is reported in inpatient studies.[7a] When from 300 to 400 units of vitamin D is given and growth is more rapid, a larger number of small changes in growth at the epiphysial line is reported, but these changes (in inpatient studies) never become any more definitely rachitic and accompany excellent retention of calcium with maintenance of serum calcium and phosphorus at high normal levels. From outpatient studies fewer bone changes are reported when large amounts of vitamin D are given. As the rate of growth seems to be nearly maximal with from 300 to 500 units of vitamin D,[8] it seems that the small changes reported as evidence of early or very mild rickets may represent equally well changes due to rapidity of growth except when no vitamin D is given.

Factors other than those which have been discussed must be considered along with the vitamin D requirement. One of these is the relative ease of administration. This has been brought out in several published studies of outpatient groups in which it was found that the amount of rickets occurring was in direct proportion to the amount of cod liver oil prescribed.[15] The apparent supremacy of vitamin D milks in outpatient studies may be ascribed to this cause.

Another factor requiring consideration is the relative efficacy of the different varieties of vitamin D. This question has been discussed at length in a previous review.[7a] It is possible that vitamin D from vegetable sources (related to ergosterol) is less potent for man on a unit for unit basis than that from animal sources (related to cholesterol). The difference in potency between these two varieties, if any exists, is small, almost certainly no greater than 1:1.5, and probably less than this. Criteria capable of determining such a narrow difference must be most exacting, and a satisfactory answer to the problem does not seem possible with available information.

A factor of apparently greater importance than the source of vitamin D is its state of concentration or dispersion. It has long been believed on the basis of clinical experience that a greater unitage of vitamin D is required as viosterol in oil than as cod liver oil. It seems probable that a large part of this difference, if not all of it, may be explained on the basis of relative dispersion. Lewis,[16] Erben[17] and Shelling[18] have shown in clinical experiments that irradiated ergosterol in a dispersed state is much more effective than the same material in a high concentration. The best concentration for efficient utilization is not known. Data[12a] (from observations of infants receiving cod liver oil and various vitamin D milks) indicate that infants can utilize vitamin D in concentrations up to at least 100 units to the gram as efficiently as they utilize this vitamin in a highly dispersed state. The difference in utilization depending on concentration makes difficult the evaluation of data on the effect of higher dosages, for these high dosages have been given almost exclusively as concentrates or patent pharmaceutic preparations. The effect of the very high dosages in decreasing appetite suggests that a larger absolute amount is absorbed than with the smaller dosages of the dispersed forms; the disproportionate antirachitic effect between concentrated and dispersed forms indicates that a much smaller proportion is absorbed from the concentrates. In view of the strong probability that concentrated forms of vitamin D are not fully absorbed, it seems wise to proceed cautiously in administering to infants high unitages of the more dispersible forms of vitamin D. The actual limit of tolerance may be lower than the amounts which hitherto have been administered without toxic effect.

Tentatively the vitamin D requirement of the infant fed cow's milk may be stated as between 300 and 400 units daily, these amounts having been shown to be efficient in prophylaxis of rickets, in producing ample retention of calcium and phosphorus and in permitting excellent skeletal growth and dentition. This requirement is stated in terms of vitamin D of no greater concentration than is found in average high grade cod liver oil.

Infants Fed Human Milk.—The requirement of breast-fed infants for vitamin D is in general less than that of babies fed cow's milk. Infants fed human milk are less liable to the development of rickets when no vitamin D is given; however, rickets is by no means rare. A study of the literature shows that the calcium retention of infants receiving human milk and no additional vitamin D is somewhat less variable than that of infants receiving cow's milk without vitamin D; but the number of low retention values observed is sufficient to account for the occasional development of rickets. In our laboratory four infants fed human milk were given from 300 to 400 units of vitamin D daily; the calcium retention was less variable than is reported for infants given no additional vitamin D, and the average retention was approximately 50 per cent higher. It seems that for infants fed human milk, as for artificially fed babies, the ingestion of vitamin D decreases the range of retention by increasing the efficiency of those with poor retentions to equal that of infants most efficient without vitamin D. It appears that for many breast-fed babies vitamin D is essential and for most of them it is useful. Though the requirement cannot be stated with accuracy on the basis of available data, it would seem wise to prescribe the same amount as is required by the artificially fed baby.

Prematurely Born Infants.—The vitamin D needs of prematurely born infants are not easy to determine because of the difficulty of supplying ample amounts of calcium and phosphorus during the first few weeks of extra-uterine life. Normally during the last month of full term pregnancy the fetal need of calcium is approximately 0.3 Gm. daily. Obviously it is not possible for a prematurely born infant fed human milk to ingest this quantity of calcium, much less to retain it. Even when the feedings are fortified with dried skimmed milk or calcium caseinate, the total calcium intake is usually under 0.6 Gm., an amount which may be considered scarcely sufficient to permit retention of 0.3 Gm. The prematurely born infant tends to grow

15. Drake, T. G. H.; Tisdall, F. F., and Brown, Alan: A Study of the Relative Antirachitic Values of Cod Liver Oil, Viosterol and Irradiated Milks, Canad. M. A. J. **31**: 368 (Oct.) 1934. Eliot, Nelson, Barnes, Browne and Jenss.[9]

16. Lewis, J. M.: Clinical Experience with Crystalline Vitamin D: The Influence of the Menstruum on the Effectiveness of the Antirachitic Factor, J. Pediat. **6**: 362 (March) 1935; Further Observations on the Comparative Antirachitic Value of Crystalline Vitamin D Administered in Milk, Corn Oil, or in Propylene Glycol, ibid. **8**: 308 (March) 1936.

17. Erben, Fridtjof: Ueber den Einfluss des Lösungsmittels auf die therapeutische Wirksamkeit des bestrahlten Ergosterins, München. med. Wchnschr. **82**: 1794 (Nov. 8) 1935.

18. Shelling, D. H.: Calcium and Phosphorus Studies: XIII. The Effect of Emulsification on the Potency of Viosterol in Treatment of Rickets in Children, J. Pediat. **10**: 748 (June) 1937.

111
938

more rapidly than the infant born at term. The combination of increased growth and deficient intake is such a handicap that it is doubtful whether the ingestion of vitamin D can compensate entirely, though it may readily compensate to the extent of preventing rickets.

Davidson, Merritt and Chipman [10d] reported that irradiated evaporated milk is inadequate to protect prematurely born infants from moderate or severe rickets. The amount of vitamin D received by these babies varied from 24 to 59 units daily at the age of 1 month. These same authors [10e] found that cow's milk containing 430 units of vitamin D to the quart protected against moderate and severe rickets but not against the roentgen signs of slight rickets. Reinterpretation of the data in the light of the preceding discussion of roentgenographic evidence of rickets in this review permits the exclusion of these cases of slight rickets and allows the conclusion that all the infants were protected. The amount of vitamin D received by these babies varied from 116 to 245 units with an average of 170 units at the age of 1 month. The average birth weight of the babies was 2,000 Gm., and the average weight at 1 month was 2,500 Gm. Horesh and Russell [19] found complete protection against rickets in prematurely born infants from the use of a protein milk containing 3.8 cc. of cod liver oil to the quart. McQuarrie [12b] obtained rickets prevention with 540 units daily as activated ergosterol. Davidson, Merritt and Chipman [20] reported that viosterol fed at a level of 3,150 units daily did not protect against roentgenographic evidence of slight rickets in prematurely born infants receiving human milk, cow's milk or mixed feeding, but again reinterpretation permits the conclusion that rickets was prevented. Shelling [21] observed osteoporosis but not rickets in premature infants given from 3,500 to 4,500 units of vitamin D as viosterol. These reports indicate that rickets is prevented in prematurely born infants by an amount of vitamin D approximately twice that known to protect the majority of full term infants and that rickets is not prevented by an amount less than that required for full term infants. No means are at hand for comparing the relative effects of the same amount of vitamin D in the two groups. The possibility remains that the prematurely born baby requires no more vitamin D for the prevention of rickets than the baby born at term. For the full term infant the amount that permits ample retention of calcium is considerably greater than that which barely prevents rickets. No doubt this holds for the prematurely born baby also. Until further information is obtained it may be tentatively considered that prematurely born babies require twice as much vitamin D as babies born at term, or from 600 to 800 units fed in a dispersed form. After the period of most rapid growth in early infancy the requirement should be the same as for the full term infant.

REQUIREMENT DURING CHILDHOOD

The requirement for ingested vitamin D has been assumed to decline after infancy, though little experimental evidence for this supposition exists. Belief in this idea is reflected in the widespread lack of use of vitamin D preparations in childhood compared to the almost universal use in infancy. The assumption of a lesser need may be based on the absence of rickets in childhood and on the presumption that older children get more sunshine than infants. Whether or not the fault is with vitamin D, there is abundant evidence that present customs of diet in this country are not fully adequate for optimal skeletal and dental development. This is attested by the prevalence of dental caries and, in late childhood, the finding of osteoporosis. As a cause of these abnormalities a deficiency of intake of calcium, vitamin D or both substances is probably more common with the American type of diet than an intake deficient in phosphorus. At least some of these defects may be caused by inadequacy of vitamin D.

The criteria of adequacy of intake of vitamin D are fewer for children than for infants. Prevention of rickets is of no value and studies of levels of calcium and phosphorus in the blood are of little assistance. The rate of growth might be useful, but no studies have come to our attention in which this criterion was used when vitamin D was the only factor varied. A criterion which has a considerable degree of usefulness is the prevention and arrest of dental caries. The most satisfactory criterion subject to quantitative measurement is the retention of calcium and phosphorus with and without vitamin D, compared with the calculated requirement for these minerals.

Dental Caries.—Numerous observations have shown that vitamin D is a factor in prevention and arrest of dental caries. In some instances vitamin D has been added to the diet in an orphanage or other group without other change. The effect on the teeth has been variable, as is to be expected. It is worth reiterating that vitamin D does not reduce the minimum requirement for calcium and that vitamin D may not be expected to improve a diet containing an amount of calcium below the minimum requirement. In order to determine the vitamin D requirement by using the criterion of dental caries, the diet must be adequate in all respects other than vitamin D, including adequate calcium and phosphorus.

Mellanby [22] administered cod liver oil in an amount containing from 700 to 1,500 units of vitamin D daily as a supplement in orphanage diets which happened to be deficient in fruits and animal protein and which contained about 500 cc. of milk daily. Mellanby reported that the children to whom cod liver oil had been given developed fewer new cavities and showed arrested progress of old caries, although carious activity was not entirely prevented. A somewhat similar type of observation by Day and Sedwick [23] gave negative results. They found no change in the carious processes in a group of school children for whom was prescribed 4,000 units of vitamin D daily as viosterol, as compared to a control group not receiving vitamin D. These children lived at home and the diets were uncontrolled. Anderson and his co-workers [24] noted a "marked decrease" in dental caries when viosterol (4,700 units) was administered to children with presumably good diets. McBeath [25] reported reduced

19. Horesh, A. J., and Russell, G. R.: Observations on the Growth and State of Nutrition of Premature Infants Given an Antirachitic and Antiscorbutic Food, Ohio State M. J. **31**: 339 (May) 1935.

20. Davidson, L. T.; Merritt, Katharine K., and Chipman, S. S.: Further Studies of Viosterol in the Prophylaxis of Rickets in Premature Infants, Am. J. Dis. Child. **51**: 594 (March) 1936.

21. Shelling, D. H., and Hopper, Katherine B.: Calcium and Phosphorus Studies: XII. Six Years' Clinical Experience with Viosterol in Prevention and Treatment of Rickets, Tetany and Allied Diseases, Bull. Johns Hopkins Hosp. **58**: 137 (March) 1936.

22. The Committee for Investigation of Dental Disease: The Influence of Diet on Caries in Children's Teeth (Final Report), Medical Research Council, Special Report Series, No. 211, London, His Majesty's Stationery Office, 1936.

23. Day, C. D. M., and Sedwick, H. J.: The Fat Soluble Vitamins and Dental Caries in Children, J. Nutrition **8**: 309 (Sept.) 1934.

24. Anderson, P. G.; Williams, C. H. M.; Halderson, H.; Summerfeldt, C., and Agnew, R. G.: The Influence of Vitamin D in the Prevention of Dental Caries, J. Am. Dent. A. **21**: 1349 (Aug.) 1934.

25. McBeath, E. C.: Nutritional Control of Dental Caries, New York State J. Med. **33**: 1086 (Sept. 15) 1933.

incidence of dental caries in an orphanage group whose diets are recorded as "good," when 10,000 units of vitamin D as viosterol was given daily without other dietary change. It is evident from the observations cited and others in the literature that vitamin D is a factor in the arrest and control of dental caries, but most of these reports give no clue to the vitamin D requirement.

McBeath [26] has reported the prevention of dental caries with the administration of an excellent experimental diet including 3 teaspoonfuls of cod liver oil. He [26] has reported also in a winter study of orphanage children a decrease in the number of new carious processes when the unrecorded diet was altered by the addition of 1 pint of milk and by 1 pint of milk containing 270, 400 and 800 units of vitamin D respectively, the improvement in the dental condition being in the order stated. Decrease in caries produced by the addition of milk alone indicates that the basal diet may not have been adequate. The apparent superiority of 800 over 400 units of vitamin D may not be actual, because these unitages were employed in different orphanages and were not added to the same basal orphanage diet. However, definite superiority of 800 over 270 units was shown.

Boyd and Drain and their co-workers [27] observed rapid arrest of dental caries in children given a well rounded diet which included a quart of milk and about 350 units of vitamin D daily, the latter in the form of cod liver oil. In a recent intensive study of four children with dental decay these authors [28] noted the effect of diets otherwise adequate but with the vitamin D intakes graduated; 0, 155 and 600 units daily were given successively to the same children. The ingestion of a good diet without added vitamin D brought about appreciable lessening of the activity of the caries during the first few weeks of the study in the fall months with the children spending much time outdoors. Subsequently for a period of five months, during which the children received a diet of high protective value aside from its vitamin D content and through both the periods of no added vitamin D and of the 155 unit addition, the caries was stationary with minimal but definite activity. It was not until the higher amount of 600 units of vitamin D had been given for nine weeks that the caries became definitely arrested. The results with 600 units daily showed no advantage of this amount over the 350 units daily intake of previous experiments.

Incidentally it is worthy of mention that the studies of Boyd and Drain have pertained exclusively to dentinal caries, while most if not all other observers have included both caries of the dentin and of the enamel in their data. Included in the latter designation, lesions due to dystrophy, fracture and disintegration have been considered; any surface irregularities deep enough to catch the exploring tine have been designated as sites of decay. Obviously not all these bear relation to nutrition. This difference of interpretation must be evaluated in comparing studies of tooth decay. The effect of nutrition on enamel disintegration remains to be determined. It is possible that complete prevention of enamel "caries" by a nutritional regimen is not to be expected.

One may conclude from the dental studies that the greatest freedom from dental caries is observed in groups of children receiving an adequate diet containing ample quantities of milk and 350 or more units of vitamin D daily. If the diet is suboptimal, the addition of vitamin D lessens the severity but does not prevent dental caries. Similarly, a diet otherwise adequate but lacking in vitamin D may decrease the incidence but not prevent entirely the development of tooth decay, nor provide for complete arrest of caries already present.

Calcium and Phosphorus Retention.—Many studies of calcium and phosphorus retention of children are available, though in but few have comparative studies been made with and without vitamin D. Unlike studies throughout infancy, wherein the dietary regimen is known for the entire period after birth, observations in childhood are more likely to be handicapped by incomplete knowledge of the previous dietary regimen. Wang [29] has shown that if the child's previous diet has been deficient in calcium, the calcium retention during the period of observation may be unusually high. In our studies there have been observed also a few children whose previous diets had been deficient in calcium but who reacted very slowly to the change in diet; only after several weeks of ingestion of an adequate diet with added vitamin D did the calcium and phosphorus retention reach the average of the group. Because of the influence of previous dietary conditions on the retention observed from a given diet, it has become customary to allow a longer period of adjustment to the experimental diet than was formerly the custom and to make a series of retention studies rather than a single observation with each given dietary. When the experiment is conducted in this manner the results are more reliable.

The adequacy of a diet in calcium, phosphorus and vitamin D may be judged by comparing the retention observed with the quantities considered ample for osseous and dental development. Because the quantity of phosphorus retained varies with the nitrogen as well as the calcium retention, the quantity of calcium retention may be used as the most convenient guide. When the standards set up by Leitch[5c] are recalculated into the more customary terms of retention per kilogram, the calcium retention considered desirable decreases from 25 mg. per kilogram for a year old child to from 10 to 12 mg. for a child over 6 years of age. These values are somewhat higher for young children than those postulated as desirable by Sherman and Hawley.[5b]

Reports of long term studies of children not given vitamin D stress the variability of calcium retention observed in a group of children [30] or in the same child from period to period of study.[31] The retention observed with an intake of 1 Gm. of calcium daily varied from 6 to 24 mg. per kilogram, and the average retention of some children was far below the amounts postulated as safe by Leitch.

Weld and Sykes [32] determined the calcium and phosphorus retention of six children over a five week

26. McBeath, E. C.: Vitamin D Studies, 1933-1934, Am. J. Pub. Health **24**: 1028 (Oct.) 1934.
27. Boyd, J. D.; Drain, C. L., and Nelson, Martha V.: Dietary Control of Dental Caries, Am. J. Dis. Child. **38**: 721 (Oct.) 1929.
28. Boyd, J. D.; Drain, C. L., and Stearns, Genevieve: Nature of Diet in Its Relationship to Control of Dental Caries, Proc. Soc. Exper. Biol. & Med. **36**: 645 (June) 1937.
29. Wang, Chi Che; Kaucher, Mildred, and Frank, Margaret: Metabolism of Undernourished Children: IV. Calcium Metabolism, Am. J. Dis. Child. **35**: 856 (May) 1928.
30. Hunscher, Helen A.; Hummel, Frances C., and Macy, Icie G.: Variability of Metabolic Response of Different Children to a Given Intake of Calcium, Proc. Soc. Exper. Biol. & Med. **35**: 189 (Oct.) 1936.
31. Porter-Levin, Thelma: Calcium and Phosphorus Metabolism of Normal Preschool Children: II. Successive Balance Studies Showing Range of Variation in Calcium and Phosphorus Studies, J. Am. Dietet. A. **9**: 23 (May) 1933.
32. Weld, C. B., and Sykes, J. F.: The Effect of Irradiated Ergosterol on Calcium and Phosphorus Retention in Children, Tr. Roy. Soc. Canada (Sect. V) **26**: 81, 1932.

period with an intake of 0.82 Gm. of calcium and no added vitamin D. During a second five week period 135 units of vitamin D as irradiated ergosterol was added to the diet of four of the children with no significant change observed in the retention.

We [33] studied fifty children aged from 1 to 12 years with varying intakes of milk and with and without added vitamin D. When given, the amount of vitamin D was from 300 to 400 units as cod liver oil daily. For the majority of these children each dietary regimen was maintained for from five to eight weeks. A few were studied for periods up to three months with one dietary regimen. All children were permitted outdoor exercise when weather allowed. The variability of retention noted by others when children were not given vitamin D was also observed in this series. The retention of the younger children was more variable than that of the older but less variable than had been observed in infants not given vitamin D. As with the infants, the addition of vitamin D decreased the variability of retention by decreasing the number of poor retentions. Thus, if a child utilized calcium efficiently without added vitamin D, the addition of the vitamin to the diet had little effect. If, however, the utilization was poor, the ingestion of vitamin D increased the retention of calcium. The increased retention was by no means always observed promptly; two of the children studied did not achieve retention equal to the average of their age group until the diet with vitamin D had been given for a period of from two to three months. One of these children had active dental caries at the beginning of the experiment; the caries remained active much longer than is customarily observed in this clinic. The retention observed in this group of fifty children indicates that the ingestion of vitamin D in no way decreases the quantity of calcium need but that it assures better utilization. A retention equal to that postulated by Leitch as desirable was consistently obtained when the milk intake was 750 cc. daily or higher and when vitamin D was given.

Daniels and her collaborators [34] fed vitamin D in daily amounts varying from approximately 1,200 units (15 cc. of cod liver oil) to 3,000 units or more (15 cc. of cod liver oil plus 8 drops of viosterol). Though these studies were of short duration, the study group was large. An average retention of about 10 mg. per kilogram was observed whether the intake of milk was 1 pint or 1 quart daily. These retention values are lower than those noted by Hunscher and her co-workers in long term studies of children of this age group not receiving additional vitamin D, and considerably lower than the average values observed by us in children of the same age range given from 300 to 400 units of vitamin D daily.

It seems from a summary of the studies which have been cited that the variability of response to the calcium of the diet is marked in young children not given vitamin D. Efficiency of utilization tends to increase with increasing age of the child, but even by 9 or 10 years of age many children seem unable to utilize efficiently the calcium and phosphorus of the diet unless vitamin D is also ingested. The daily allowance of at least 750 cc. of milk together with from 300 to 400 units of vitamin D seems to permit consistently ample retention of calcium and phosphorus for proper development of bone and teeth. The data at hand are not sufficient to allow an accurate estimate of the optimal intake of vitamin D for children, though it appears probable that the total quantity needed daily is not greater than the amount required for infants, nor does it seem to be less.

ADOLESCENCE

The literature contains very few reports of studies of either the calcium or the vitamin D requirement of adolescents, notwithstanding the fact that this age period is of special importance because of the rapid skeletal growth. Leitch has estimated that a retention of from 500 to 700 mg. of calcium daily is necessary to maintain normal calcification during this period. The condition of the teeth of the average adolescent and the possible occurrence of osteoporosis [35] during this period of growth indicate inadequacy of present dietaries. Whether in this state of suboptimal calcification the need is primarily for calcium or for vitamin D is difficult to determine with the data at hand.

Herbst [35] in 1913 reported calcium retention of two boys aged 13 and 14 years, with a calcium intake of 0.62 and 0.64 Gm. daily. The younger, who was growing rapidly, retained 0.3 Gm. of calcium daily, the older 0.15 Gm. Wang and her associates [36] have summarized the scanty data in the older literature and have added twenty-three six day studies of girls from 12 to 15 years of age. Vitamin D was not given. In Wang's study the daily intake of calcium varied from 1.18 Gm. to 1.80 Gm. and the retention from 0.079 Gm. to 0.823 Gm., or from 1 to 19 mg. with an average of 11 mg. per kilogram; the average retention was 417 mg. daily, two thirds of the group retaining less than the Leitch standard of 500 mg. daily.

Henderson and Kelly [37] studied for twenty-four weeks the calcium retention of five African boys aged from 15 to 17 years. With the control diet containing 0.3 Gm. of calcium the boys lost calcium at a rate of approximately 0.1 Gm. a day. The addition of cod liver oil to the diet of one boy did not decrease the calcium loss. The diets of three of the subjects were then supplemented respectively with 1 pint of milk daily, a mineral mixture equivalent to the minerals of 1 pint of milk daily, and the mineral mixture with added cod liver oil. The calcium retention of each of the three boys was consistently positive, varying from 0.096 Gm. to 0.5 Gm. daily, the higher value being obtained with the addition of milk without cod liver oil. The data are insufficient to permit evaluation of the effect of vitamin D added to the increased diet but do demonstrate that the ingestion of vitamin D did not decrease the minimal requirement for calcium.

The data obtainable from studies of adolescents indicate that individuals are by no means equally efficient in retaining calcium without the ingestion of vitamin D. Apparently the variability in ability to utilize the calcium and phosphorus of the diet is a major factor in determining the quantity of these elements retained by adolescents as well as by younger

33. Jeans, P. C., and Stearns, Genevieve: The Vitamin D Requirement of the Child, Proc. Am. Pediat. Soc., Am. J. Dis. Child. **54**: 189 (July) 1937.

34. Daniels, Amy L.; Hutton, Mary K.; Knott, Elizabeth; Everson, Gladys, and Wright, Olive E.: Relation of Ingestion of Milk to Calcium Metabolism in Children, Am. J. Dis. Child. **47**: 499 (March) 1934. Daniels, Amy L.; Hutton, Mary K.; Knott, Elizabeth; Wright, Olive, and Forman, Mary: Calcium and Phosphorus Needs of Pre-School Children, J. Nutrition **10**: 373 (Oct.) 1935.

35. Herbst, O.: Calcium und Phosphor beim Wachstum am Ende der Kindheit, Ztschr. f. Kinderh. **7**: 161, 1913.

36. Wang, Chi Che; Kaucher, Mildred, and Wing, Mary: Metabolism of Adolescent Girls: IV. Mineral Metabolism, Am. J. Dis. Child. **52**: 41 (July) 1936.

37. Henderson, J. M. and Kelly, F. C.: Influence of Certain Dietary Supplements in Relation to the Calcium Requirements of Growing African Natives, J. Hyg. **29**: 429 (Feb.) 1930.

children. It is indicated also that vitamin D does not lower the minimum requirement for ingested calcium, though no estimate can be made as to the optimal intake of either calcium or vitamin D.

REQUIREMENTS OF ADULTS

Men and Nonpregnant Women.—During adult life the quantity of calcium and phosphorus considered necessary is only that amount sufficient for maintenance. It may be found that some retention of calcium and phosphorus is desirable, at least during the post-adolescent period. Whether the addition of vitamin D may be necessary to insure such retention or whether the ingestion of vitamin D would insure better utilization of an intake only slightly above minimal requirements are questions difficult to answer with the few data at hand.

Much of the calcium intake of adults may be from sources other than milk; therefore the acid-base ratio of the diet assumes importance. The ingestion of an acid-ash diet or of acid salts increases the urinary excretion of calcium. If the intake is low, the added excretion may be sufficient to cause a negative calcium balance. Wide differences in intake ratios of calcium and phosphorus apparently have less effect on the retention of these elements by adults [38] than by children.[39]

Leitch [5c] has summarized the data for the calcium requirement of women not ingesting vitamin D. She concluded that, at or above a daily intake of 0.55 Gm. of calcium, losses of one period were equaled by gains of another, whereas below this intake output usually exceeded intake. The minimum calcium requirement as set by Sherman [40] is somewhat lower; namely, 0.45 Gm. a day. Few data are available concerning the requirement for men, but such as there are [5c] indicate that the daily requirement is about the same as for women.

Most of the published studies of the effect of vitamin D on calcium and phosphorus retention of adults have centered on an attempt to determine whether an increased ingestion of vitamin D decreases the minimal requirement for calcium. The answer is unanimously in the negative.[41] When vitamin D has been given as an addition to a diet containing more than the minimal requirement of calcium, the results have been conflicting. All the subjects studied by Kelly and Henderson [41] and by Bauer and his co-workers [41] retained calcium when the intake of this element was ample and no vitamin D was ingested. A further increase in retention was noted by Kelly and Henderson when cod liver oil was given in addition to the increased mineral intake. Bauer and his collaborators observed no increase in retention when from 30 to 90 mg. of irradiated ergosterol was given in addition to the high calcium diet but did obtain evidence of increased absorption, for the urinary excretion of calcium was increased and the fecal calcium correspondingly decreased when vitamin D was given. Hunscher and her co-workers [42] studied three young women whose calcium intake varied from 0.7 to 1.0 Gm. a day, amounts ordinarily considered ample. When no vitamin D was given two of the three women consistently lost 0.1 Gm. of calcium a day, the third was approximately in calcium equilibrium. When 15 Gm. of cod liver oil was given daily for twenty-three days the average calcium losses were not decreased, nor do the data show any significant alteration in the mode of calcium excretion.

Data are not available as to the effect of vitamin D on retention of calcium and phosphorus by middle-aged or elderly persons. The prevalence of senile osteoporosis may be due wholly to the habit common to most American adults of ingesting diets low in calcium. It has been shown [43] that mineralization of bone can be increased in adults past 60 by increasing the intake of calcium and vitamin D. Since elderly persons are less likely to be exposed to sunlight than more vigorous younger adults, the ingestion of moderate amounts of vitamin D, together with a diet ample in calcium and phosphorus, might serve to prevent the development of osteoporosis in the older adult.

Animal studies bearing on these questions include those of Sherman and Campbell,[6b] who showed that when young rats are given a diet somewhat subminimal in calcium content, normal growth occurs, but normal calcification of bone is not achieved until nearly middle age. A recent report of these authors [44] lists an ample intake of calcium among the factors resulting in longer life and extension of the period of adult vitality of rats. Even if these observations are assumed to hold for human beings, there still remains to be determined whether and how much vitamin D would contribute to better utilization of calcium by adults.

The observations on adults indicate, as for children, that the ingestion of vitamin D in no way lessens the requirement for calcium. Whether vitamin D, when given in addition to an ample mineral intake, increases the utilization of calcium undoubtedly varies with the person. Although the average adult seems more efficient in the absorption of calcium than the average child, vitamin D may aid the inefficient adult in the same manner as the inefficient child. If this is true, the amount of vitamin D optimal for this purpose remains to be determined.

Reed and others [45] have given vitamin D in enormous dosage to adults, with apparently few untoward effects. The limit of tolerance varies with the individual but seems to be 150,000 units or more. The vitamin in these studies was given always as a very concentrated product. Whether adults utilize the concentrated sources of vitamin D efficiently or not, the enormous unitage given can be interpreted as indicating that the tolerance of the adult to vitamin D must be relatively high.

Pregnancy and Lactation.—The calcium and phosphorus requirement during pregnancy and lactation has

38. Farquharson, R. F.; Salter, W. T., and Aub, J. C.: The Effect of the Ingestion of Phosphates on the Excretion of Calcium, J. Clin. Investigation **10**: 251 (June) 1931.

39. Stearns, Genevieve, and Jeans, P. C.: Utilization of Calcium Salts by Children, Proc. Exper. Biol. & Med. **32**: 428 (Dec.) 1934.

40. Sherman, H. C.: Calcium Requirement of Maintenance in Man, J. Biol. Chem. **44**: 21 (Oct.) 1920.

41. Hart, M. C.; Tourtellotte, Dee, and Heyl, F. W.: Effect of Irradiation and Cod Liver Oil on Calcium Balance in the Adult Human, J. Biol. Chem. **76**: 143 (Jan.) 1928. Kelly, F. C., and Henderson, J. M.: The Influence of Certain Dietary Supplements on the Nutrition of the African Native: I. J. Hyg. **29**: 418 (Feb.) 1930. Bauer, Walter; Marble, Alexander, and Claflin, Dorothy: Studies on the Mode of Action of Irradiated Ergosterol: I. Its Effect on the Calcium, Phosphorus and Nitrogen Metabolism of Normal Individuals, J. Clin. Investigation **11**: 1 (Jan.) 1932.

42. Hunscher, Helen A.; Donelson, Eva, and Erickson, Betty Nims: Results of the Ingestion of Cod Liver Oil and Yeast on Calcium and Phosphorus Metabolism, J. Nutrition **8**: 341 (Sept.) 1934.

43. Meulengracht, E., and Meyer, A. R.: Ugeskr. f. laeger. **98**: 961, 1936; quoted by Leitch.[5c]

44. Sherman, H. C., and Campbell, H. L.: Nutritional Well-Being and Length of Life as Influenced by Different Enrichments of an Already Adequate Diet, J. Nutrition **14**: 609 (Dec. 10) 1937.

45. Reed, C. I.: Symptoms of Viosterol Overdosage in Human Subjects, J. A. M. A. **102**: 1745 (May 26) 1934. Wyatt, B. L.; Hicks, R. A., and Thompson, H. E.: Massive Doses of Vitamin D in the Treatment of Proliferative Arthritis, Ann. Int. Med. **10**: 534 (Oct.) 1936. Steck, I. E.: Clinical Experience in the Treatment of Arthritis with Massive Doses of Vitamin D, Illinois M. J. **71**: 243 (March) 1937. Ceder, E. T., and Zon, Leo: Treatment of Psoriasis with Massive Doses of Crystalline Vitamin D and Irradiated Ergosterol, Pub. Health Rep. **52**: 1580 (Nov. 5) 1937.

111
938

received much intensive study. The report of Bauer and Aub [46] indicates that with a subminimal intake the pregnant woman is unable to conserve calcium for the needs of the fetus. The Toveruds [47] observed that when the mother's diet was deficient, the skull of the infant was softer than normal, the epiphysial lines, particularly of the metacarpals, were fringed and poorly calcified, and the teeth when erupted were often grossly hypoplastic. They observed further that when the mother's diet contained ample calcium and vitamin D, the bones and teeth of the infant were normal. Finola [48] and his co-workers noted a significant increase in the density of bone and a decrease in the size of the fontanel of babies whose mothers received a good diet plus approximately 1.5 Gm. of calcium as dicalcium phosphate and 7,000 units of vitamin D as viosterol, in comparison with infants whose mothers received a good diet without the addition of calcium and vitamin D.

The Toveruds [47] and Mellanby [49] both consider a poor diet of the mother during pregnancy as one of the chief predisposing factors in the development of rickets and dental caries in the children. Calcium and vitamin D are two of the factors most often deficient in the mother's diet. Corroborative evidence of the need of increased mineral retention in pregnancy is obtained in the study of Drain and Oberst [50] wherein the dental condition of pregnant women was shown to be improved by a diet rich in calcium and vitamin D.

The work of many investigators [51] demonstrates that a calcium intake of at least 1.4 to 1.6 Gm. daily is necessary in order to permit retention of the amount of calcium needed by the fetus. Below this intake the addition of vitamin D does not insure retention. With a calcium intake of from 1.6 to 2.5 Gm. some persons can retain calcium in ample amounts even without added vitamin D. Studies of multiparas [52] show that the drain of rapidly succeeding pregnancies and periods of lactation may result in poor retention of calcium and phosphorus regardless of intake unless vitamin D is also given. Very few show poor retention with a high intake of calcium even when the vitamin D intake is equivalent to 20 Gm. of cod liver oil. In general the addition of vitamin D in amounts supplied by from 10 to 20 Gm. of cod liver oil daily tends to increase the retention of calcium and phosphorus. Insufficient studies have been made with ample intake of calcium and varying amounts of vitamin D to permit a conclusion or general statement as to the vitamin D requirement during pregnancy.

The studies of lactation [53] indicate that the drain on the mother is more severe than in pregnancy. The need for ample calcium intake is imperative. There seems necessary an intake of at least 1½ quarts of milk, containing 1.8 Gm. of calcium and representing a total day's intake of more than 2 Gm. Even then, relatively few women are efficient enough to prevent loss of calcium from the body unless additional vitamin D is given. Desirable amounts of vitamin D seem to vary with the individual, as shown by the following unpublished study from our laboratory: Two primiparas, aged 21 and 26, ingested good diets, each containing 1,500 cc. of milk and one teaspoonful of cod liver oil (from 350 to 400 units) daily. The 21 year old woman secreted from 1,000 to 1,500 cc. of milk daily and retained calcium continuously. The other woman secreted never more than 600 cc. of milk a day yet continuously lost calcium from the body; increasing the calcium intake decreased the loss but did not prevent it entirely. Again, two other primiparas, aged 17 and 19, were given from 1,800 to 2,000 cc. of milk daily. One retained calcium consistently throughout lactation; the other was unable to retain calcium until from 750 to 800 units of vitamin D daily as cod liver oil was given. The milk output of the latter was approximately 1,500 cc. and that of the former approximately 1,000 cc. a day.

Hunscher's studies [53] tend to show that in rapidly succeeding pregnancies and lactation periods vitamin D is especially necessary and that ample calcium intake does not suffice to prevent loss of calcium from the body unless vitamin D is given.

One factor often overlooked is the effect of the maternal diet on the quality of the milk secreted. Telfer [54] commented on the higher mineral content of milk of country women compared to that of women from cities. The differences were ascribed to diet and to the relative amount of sunlight. The Toveruds [47] found a low calcium content in the milk of fourteen mothers whose diets were poor; when the calcium intake was increased the calcium content of the milk of each woman was increased after one week, the average increase being about 25 per cent. The effect of added vitamin D was not studied, but the possibility of its ingestion increasing the calcium content of the milk should not be ignored. The content of calcium in human milk varies considerably according to reports.

While available data point strongly to the advisability of giving vitamin D during pregnancy and lactation, it is impossible with our present information to arrive at any conclusion regarding optimal dosage. Individual variability has been demonstrated. The amount of vitamin D to be recommended is that which is desirable for the least efficient in utilizing the calcium of the diet. This amount may be greater, especially during lactation, than at any other period of life.

46. Bauer, Walter; Albright, Fuller, and Aub, J. C.: Studies of Calcium and Phosphorus Metabolism: II. The Calcium Excretion of Normal Individuals on a Low Calcium Diet; also Data on a Case of Pregnancy, J. Clin. Investigation **7**:75 (April) 1929.

47. Toverud, K. U., and Toverud, G.: Studies on Mineral Metabolism During Pregnancy and Its Bearing on Disposition to Rickets and Dental Caries, Acta paediat. **12**: (supp. 2) 1-116, 1931.

48. Finola, G. C.; Trump, Ruth A., and Grimson, Mozelle: Bone Changes in the Fetus Following the Administration of Dicalcium Phosphate and Viosterol to the Pregnant Mother, Am. J. Obst. & Gynec. **34**: 955 (Dec.) 1937.

49. Mellanby, May: Diet and the Teeth: III. The Effect of Diet on Dental Structure and Disease in Man, Medical Research Council, Special Report Series, no. 191, London, His Majesty's Stationery Office, 1934.

50. Drain, C. L.; Plass, E. D., and Oberst, W. F.: Prevention and Control of Dental Caries in Pregnant Mothers, J. Dent. Research **13**: 233 (April) 1933.

51. Garry, R. C., and Stiven, D.: A Review of Recent Work on Dietary Requirements in Pregnancy and Lactation, with an Attempt to Assess Human Requirements, Nutrition Abstr. & Rev. **5**:855 (April) 1936. Macy, Icie G., and Hunscher, Helen A.: Evaluation of Maternal Nitrogen and Mineral Needs During Embryonic and Infant Development, Am. J. Obst. & Gynec. **27**:878 (June) 1934. Hummel, Frances C.; Hunscher, Helen A.; Bates, Mary F.; Bonner, Priscilla; Macy, Icie G., and Johnston, J. A.: A Consideration of the Nutritive State in the Metabolism of Women During Pregnancy, J. Nutrition **13**:263 (March) 1937. Coons, Callie Mae; Schietelbusch, A. T.; Marshall, G. B., and Coons, R. R.: Studies in Metabolism During Pregnancy, Oklahoma Agriculture and Mechanical College, Agriculture Experiment Station, Bulletin 223, March, 1935. Coons, Callie Mae, and Coons, R. R.: Some Effects of Cod Liver Oil and Wheat Germ on the Retention of Iron, Nitrogen, Phosphorus, Calcium and Magnesium During Human Pregnancy, J. Nutrition **10**:289 (Sept.) 1935. Toverud and Toverud.[47]

52. Macy, Icie G.; Hunscher, Helen A.; Nims, Betty, and McCosh, Sylvia S.: Metabolism of Women During the Reproductive Cycle: I. Calcium and Phosphorus Utilization in Pregnancy, J. Biol. Chem. **80**:17 (March) 1930. Hummel, Frances C.; Sternberger, Helen R.; Hunscher, Helen A., and Macy, Icie G.: Metabolism of Women During the Reproductive Cycle: VII. Utilization of Inorganic Elements (A Continuous Case Study of a Multipara), J. Nutrition **11**:235 (March) 1936.

53. Macy, Icie G.; Hunscher, Helen A.; McCosh, Sylvia S., and Nims, Betty: Metabolism of Women During the Reproductive Cycle: III. Calcium, Phosphorus and Nitrogen Utilization in Lactation Before and After Supplementing the Usual Home Diets with Cod Liver Oil and Yeast, J. Biol. Chem. **86**:59 (March) 1930. Hunscher, Helen A.: Metabolism of Women During the Reproductive Cycle: II. Calcium and Phosphorus Utilization in Two Successive Lactation Periods, ibid. **80**:37 (March) 1930. Toverud and Toverud.[47] Footnote 52.

54. Telfer, S. V.: Mineral Metabolism in Infancy: I. The Mineral Constituents of Human Milk and Cow's Milk, Glasgow M. J. **115**: 246 (May) 1930.

Animal experiments wherein large amounts of vitamin D were given to pregnant rats show that, if the maternal diet is good, the calcium and phosphorus content of the bones of the young rats is increased above that of the control group;[55] large doses of viosterol together with a deficient diet result in decreased content of mineral in the bones of young.[55] Subtoxic doses of vitamin D given to rats receiving a diet deficient in minerals during gestation increase the calcium and phosphorus content of the offspring over that of young born of mothers given the deficient diet without added vitamin D.[56] Hypervitaminosis D has not been reported in women during pregnancy and lactation; consequently the effect is unknown.

SUMMARY

Individual variation in ability to utilize the calcium and phosphorus of the diet without added vitamin D exists at all age periods. A high proportion of infants have poor retention and only a very few retain an ample amount without vitamin D. As the age increases persons in increased proportion are able to retain adequate amounts of these minerals without vitamin D, but at all age periods some persons are found who are not efficient. In defining a standard for the vitamin D requirement it seems desirable to state an amount which will be satisfactory for those who are less efficient. Vitamin D tends to decrease the range of retention of calcium and phosphorus in study groups by increasing the retention of those least efficient to approximate that of those most efficient. Vitamin D ordinarily does not increase the retention of those who have high retention without it.

Vitamin D does not decrease the minimum requirement of calcium and phosphorus and this vitamin cannot produce a good retention in a person who is ingesting less than the requirement for these minerals. Determination of the need for vitamin D must be based on studies of persons who are receiving an ample intake of calcium and phosphorus.

It appears from available evidence that vitamin D is not as well utilized on a unit for unit basis from the more concentrated preparations as from those preparations in which it is more widely dispersed. The most desirable concentration has not been determined, but apparently the concentration found in cod liver oil is as effective as any lesser concentration studied.

On the basis of the preceding premises and of an evaluation of data in the literature the requirement for vitamin D for different age periods and conditions has been tentatively postulated. These requirements are considered in terms of a concentration of vitamin D no greater than is found in average high grade cod liver oil.

The vitamin D requirement of the full term artificially fed baby is probably between 300 and 400 units a day.

Normal babies receiving human milk require less vitamin D than do babies receiving cow's milk, but how much less is not known. However, vitamin D is necessary for many and useful for most breast-fed babies. It would seem wise to prescribe for them the same amount as is required by artificially fed babies.

It is tentatively considered that prematurely born babies may require twice as much vitamin D as full term babies during the early period of most rapid growth, after which time the requirement should be the same as for babies born at term.

For children between infancy and adolescence a daily allowance of at least 750 cc. of milk together with from 300 to 400 units of vitamin D permits consistently ample retention of calcium and phosphorus. The optimal quantity of vitamin D cannot be stated accurately, though it appears probable that the total quantity needed is neither greater nor less than the amount required for the infant.

For adolescents a need for vitamin D exists, but insufficient data are available to permit an estimate of the quantity required. It seems probable that from 300 to 400 units a day would be satisfactory.

For adults the optimal amount of vitamin D, if a need exists, remains to be determined.

It appears strongly advisable to give vitamin D during pregnancy and lactation. The optimal amount is not known. During lactation the requirement may be greater than at any other period of life and a daily dosage of 800 units or more is suggested, together with an abundant intake of calcium and phosphorus.

55. Nicholas, H. D., and Kuhn, Evelyn M.: Role of Calcium, Phosphorus and Vitamin D in Pregnancy, J. Clin. Investigation **11**: 1313 (Nov.) 1932.

56. Sontag, L. W.; Munson, Paul, and Huff, Elton: Effects on Fetus of Hypervitaminosis D and Calcium and Phosphorus Deficiency During Pregnancy, Am. J. Dis. Child. **51**: 302 (Feb.) 1936.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORTS. HOWARD A. CARTER, Secretary.

ELECTROSTATIC AIR CLEANER ACCEPTABLE

Manufacturer: Westinghouse Electric Manufacturing Company.

Distributor: Atmospheric Electric Filter Corporation, Woolworth Building, New York.

The Electrostatic Air Cleaner is designed, according to the manufacturer, to remove smoke, dust, pollens and other impurities from outside or inside air by an electrostatic filter system. The portable unit comes in a walnut or ivory cabinet, 34 inches long by 34 inches high by 18 inches deep, weighing approximately 150 pounds. It may be installed in a window. Connection for the fresh air supply is made by a sliding window-block arrangement. The firm states that the unit will also aid in eliminating drafts and street noises.

Electrostatic Air Cleaner.

The filter operates, it is said, by ionizing the dust particles in a chamber containing three high tension wires. Negative charges are imparted to the dust particles. Then, as they move on and pass through the collector plates bearing positive charges, the ionized particles are drawn toward the plates and stick to them. The air is drawn through the cleaning unit by means of a fan which is not noisy in operation. The cleaner does not remove all gases and vapors, since some particles are too minute to be deposited in the foregoing manner. The integral part containing the collector plates where the dust and pollen lodge may be removed and a hose turned on it for cleaning purposes.

An investigator acceptable to the Council tested the unit for efficiency in removing pollen from the air. The tests were made during the hay fever season of 1937.

Slides coated with petrolatum were exposed at the outlet of the unit and were examined for pollen granules. Slides were also exposed outdoors to obtain the pollen count for the same period of time by the method described by O. C. Durham. On only one or two occasions were any pollen granules observed on the slides exposed at the outlet ducts; never more than two per unit area of 1 square centimeter in a twenty-

111
938

four hour period, while the pollen count outdoors during this period averaged from 100 to 400 granules per square centimeter.

The unit was put out of service August 29 and was again started on the night of September 6, with a fresh batch of slides at the outlet duct prior to operation. These slides were again changed within one hour and showed several pollen granules and dust particles ranging as high as from 12 to 15 microns in diameter. However, slides placed in position at the outlet duct as the first batch were removed did not show any pollen and very little dust within the succeeding twenty-four hours. The pollen count at this particular time, however, was quite low. One would assume from these results that, during the time the Electrostatic Air Cleaner was turned off, pollen and dust which had adhered to the plates had dropped to the bottom of the cell and with the first blast of air had been blown through.

The unit was tested for its air volume by the anemometer method. The average of a group of readings with the damper opened gave 211 cubic feet per minute or 12,860 cubic feet per hour. With the damper shut, that is, with the recirculation in effect, the readings were 214 cubic feet per minute or 12,900 cubic feet per hour. The investigator's conclusion was that this filter is efficient for removal of a large portion of pollen and dust particles from the air.

In view of the foregoing report, the Council on Physical Therapy voted to accept the Electrostatic Air Cleaner for inclusion in its list of accepted devices.

SPENCER MATERNITY SUPPORTS ACCEPTABLE

Manufacturer: Spencer Corset Company, Inc., New Haven, Conn.

The Spencer Maternity Supports are designed to aid in upholding the back and abdomen during pregnancy and are adaptable for increases in size of figure. The firm claims that the garment is built to place the weight of support on the pelvic girdle, thus relieving lumbosacral strain. Each support is made according to individual measurements submitted by the corsétière, the saleswoman for the company. Light weight flexible material is incorporated in the finished product, which may be laundered. The boning in Spencer supports is of special steel covered with a material claimed to be impervious to moisture. This boning is called Spencerbone, because it is manufactured exclusively for the firm and from its own formula.

The abdomen is supported by a nonelastic adjustable inner section, which is joined to the nonelastic backing by three straps on either side. The backing is made high and long enough for the individual figure. Abdominal uplift is regulated by adjustment of the lower straps. Because special elastic lacers are used, the only daily adjustment necessary is that of the inner supporting section.

The supporting section and straps are covered by the front part of the corset, thus presenting a smooth surface for the outer clothing to fit over. The section of the material to which eyelets are attached for lacers is placed so that the imprint of the lacers will not be insinuated onto the outer clothing. One elastic lacer extends the full length of the garment in front; there is another lacer at each side front extending from the top to the groin line. These are adjusted only as increasing size demands. Hooks and eyes are used for fastening the garment.

According to the Spencer Corset Company, these supports are sold through their sales representatives (women), known as Spencer corsétières. The corsétières are not permitted to diagnose; they are required to cooperate with the physician by fitting the type of support he prescribes. They are also instructed to arrange for the physician's inspection of a completed and fitted garment, whenever it is possible. All garments are designed for the individual patient. The company claims that no stock garments are made or sold.

The Spencer Corset Company has informed the Council that it has never paid commissions or rebated any percentage of the selling price to physicians on any of its merchandise, and assures the Council that it will not do so in the future. Furthermore, the manufacturer has stated that the corsétières are under instructions not to pay commissions or gratuities of any kind and that any violation of this rule would cause them to lose their franchises.

These garments have been investigated by reliable physicians, who state that they render satisfactory service to obstetric patients.

In view of the foregoing report, the Council on Physical Therapy voted to accept the Spencer Maternity Support for inclusion in its list of accepted devices.

BURDICK SWD-50 SHORT WAVE DIATHERMY ACCEPTABLE

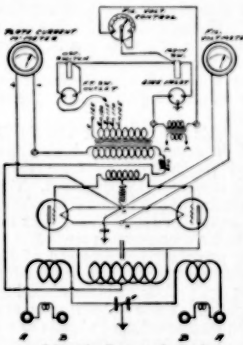
Manufacturer: The Burdick Corporation, Milton, Wis.

The Burdick SWD-50 portable short wave diathermy unit is designed for medical diathermy and for minor electrosurgery. Standard accessories are available for cutting and coagulating purposes. The unit is made of furniture steel with all metal welded construction. The portable unit weighs approximately 60 pounds, while the lower cabinet weighs 35 pounds.

Burdick SWD-50 Short Wave Machine.

A two-tube push-pull self-rectified circuit is utilized with loose inductive coupling to patient's electrodes. The wavelength is 15 meters. The patient's circuit is turned by a wide range variable resonance control. Two patient's outlets are provided, one for use with large pads and average spacing, one for small pads with thicker spacing.

The firm claims that the unit has an output of 325 watts as measured by a lamp load, photoelectric cell and wattmeter. The input is approximately 720 watts. These claims were confirmed by an investigator acceptable to the Council. Transformer temperature rise and the rise at various levels within the cabinet after a two hour run at full load were within the limits of safety. Radio interference is minimized by the type of construction and inclusion of an inductance capacity filter in the line supply.



Schematic diagram of circuit.

Six tests, performed by a reliable investigator, were submitted as evidence of the ability of the SWD-50 unit to produce heat deep in human tissues. The technical procedure for making the tests was that recommended by the Council on Physical Therapy. Six observations were made with the cuff technic. These were 2¾ by 2½ inches in dimension. The average distance of the cuffs, center to center, was 8½ inches. Felt and four thicknesses of a hand towel were used to secure a necessary five-eighths inch skin electrode distance. Skin tolerance was not exceeded. The averages for the six tests are as follows:

Average of Six Observations, Cuff Technic

Deep Muscle		Oral	
Initial	Final	Initial	Final
98.0	106.1	98.6	99.0

The unit was tested clinically by a reliable investigator and he reported that it produced satisfactory clinical results in a large and mixed group selected for study when the cuff technic is used.

In view of the foregoing report, the Council on Physical Therapy voted to accept the Burdick SWD-50 Short Wave Diathermy Unit for inclusion in its list of accepted devices.

Council on Foods

ACCEPTED FOODS

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED BY THE COUNCIL ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION AND WILL BE LISTED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED.

FRANKLIN C. BING, Secretary.

(1) NUTRADIET YELLOW CLING PEACHES PACKED IN WATER
(2) NUTRADIET SLICED YELLOW CLING PEACHES PACKED IN WATER

Distributor.—The Nutradiet Company, a subsidiary of S & W Fine Foods, Inc., San Francisco.

Description.—Canned, peeled, halved and sliced Yellow Cling peaches packed in water without added sugar.

Manufacture.—Tree-ripened Yellow Cling peaches, from trees on which no insecticide spray is used after the blossoms appear, are mechanically cut in halves and the pits are removed. The fruit is immersed in a 2 per cent solution of caustic soda to remove the skins, thoroughly washed, inspected, graded [(2) sliced] and packed in cans. Water is added and the containers are exhausted in the presence of steam, sealed and processed in boiling water.

Analyses (submitted by manufacturer).—(1) Moisture 92.8%, total solids 7.2%, ash 0.2%, fat (ether extract) 0.1%, protein (N × 6.25) 0.4%, crude fiber 0.25%, carbohydrates other than crude fiber (by difference) 5.85%, titratable acidity as citric and/or malic acid 0.4%. (2) Moisture 93.1%, total solids 6.9%, ash 0.2%, fat (ether extract) 0.1%, protein (N × 6.25) 0.3%, crude fiber 0.23%, carbohydrates other than crude fiber (by difference) 5.8%, titratable acidity as citric and/or malic acid 0.3%.

Calories.—(1) 0.26 per gram; 7 per ounce.
(2) 0.25 per gram; 7 per ounce.

Claims of Manufacturer.—For diets in which sweetened fruit is proscribed.

SUNFILLED BRAND CONCENTRATED ORANGE JUICE

Manufacturer.—Citrus Concentrates, Inc., Dunedin, Fla.

Description.—Canned concentrated orange juice prepared from Florida oranges.

Manufacture.—Tree-ripened sound oranges are inspected, washed and mechanically split. The juice is extracted by gentle pressure, strained, evaporated to about one tenth its original volume, automatically filled into cans and sealed under reduced pressure.

Analysis (submitted by manufacturer).—Moisture 24.0%, total solids 76.0%, ash 2.7%, protein (N × 6.25) 3.5%, reducing sugar as invert 26.0%, sucrose 31.3%, carbohydrates (by difference) 63.3%, citric acid 6.5%, vitamin C (iodine titration) 2.5 mg. per gram, specific gravity 1.369.

Calories.—2.67 per gram; 76 per ounce.

Vitamins.—The concentrate, when diluted with 9 parts of water by volume, furnishes approximately 645 international units of vitamin C per hundred grams of solution.

MULL-SOY

Manufacturer.—The Muller Laboratories, Baltimore.

Description.—A food preparation for use as a substitute for milk in feeding infants, older children or adults who are sensitive to the proteins of cow's milk. Contains soy bean flour, soy bean oil, dextrose, sucrose, calcium phosphate, sodium chloride, calcium carbonate and cod liver oil concentrate.

Manufacture.—The soy bean flour ingredient is prepared by the "expeller" process, in which soy beans are heated under steam pressure, split and hulled, and again heated. The oil is pressed out and the resulting cake is ground to flour. Formula proportions of the solid ingredients are thoroughly mixed with suitable amounts of water and heated; soy bean oil and cod liver oil concentrate are added and the mixture is homogenized, heated, and filled into cans. The sealed cans are heat processed.

Analysis (submitted by manufacturer).—Moisture 75.0%, total solids 25.0%, ash 2.0%, fat (ether extract) 7.8%, protein (N × 6.25) 6.0%, crude fiber 0.3%, sucrose 1.5%, dextrose 3.3%, total carbohydrates other than crude fiber (by difference) 8.9%, calcium (Ca) 0.26%, phosphorus (P) 0.22%, sodium (Na) 0.16%.

Calories.—1.3 per gram; 37 per avoirdupois ounce; 40 per fluidounce.

Vitamins.—Vitamin A, 4.4 international units per gram; 2,000 international units per quart when diluted with an equal volume of water. Vitamin B_1, 0.2 international unit per gram; approximately 100 international units per diluted quart. Vitamin D, 0.9 international unit per gram; approximately 400 international units per diluted quart.

MRS. PALEY'S BABY FOOD—STRAINED EVAPORATED PEACHES

Manufacturer.—Paley-Sachs Food Company, Houston, Texas.

Description.—Cooked, sieved, sulfured dried peaches, packed with added dextrose.

Manufacture.—Dried, sulfured peaches are washed, soaked for twelve hours, precooked in pressure cookers with added dextrose, sieved, filled into glass jars, vacuum sealed and heat processed.

Analysis (submitted by manufacturer).—Moisture 73.5%, total solids 26.5%, ash 1.0%, fat (ether extract) 0.3%, protein (N × 6.25) 1.6%, reducing sugars as dextrose 11.9%, sucrose 7.3%, crude fiber 0.5%, total carbohydrates other than crude fiber (by difference) 23.1%, calcium (Ca) 0.022%, phosphorus (P) 0.043%, iron (Fe) 0.003%, sulfur dioxide (SO_2) 0.0156%.

Calories.—1 per gram; 28.4 per ounce.

HEKMAN'S 100 PER CENT WHOLE WHEAT RUSK

Manufacturer.—Dutch Tea Rusk Company, Holland, Mich.

Description.—Round slices of toast prepared from whole wheat flour, milk, brown sugar, eggs, vegetable shortening, yeast, malt extract, salt and soda.

Manufacture.—A dough is made of the foregoing ingredients and allowed to ferment. The pieces of dough (buns) are baked in round covered pans, sliced and the halves dried, toasted and packed in cartons.

Analysis (submitted by manufacturer).—Moisture 8.6%, total solids 91.4%, ash 1.8%, fat (ether extract) 8.9%, protein (N × 6.25) 13.6%, crude fiber 1.9%, total carbohydrates other than crude fiber (by difference) 65.2%, iron 0.0057%.

Calories.—3.95 per gram; 112 per ounce; about 60 per rusk.

MRS. PALEY'S BABY FOOD—STRAINED TOMATOES

Manufacturer.—Paley-Sachs Food Company, Houston, Texas.

Description.—Canned, sieved tomatoes, slightly seasoned with salt.

Manufacture.—Fresh tomatoes are thoroughly washed, trimmed, cooked until soft and sieved. The sieved tomatoes are reduced to the desired consistency by cooking in the absence of air, filled into glass jars, vacuum sealed and heat processed.

Analysis (submitted by manufacturer).—Moisture 93.5%, total solids 6.5%, ash 0.1%, fat (ether extract) 0.1%, protein (N × 6.25) 1.1%, reducing sugars as dextrose 2.8%, sucrose 0.6%, crude fiber 0.3%, total carbohydrates other than crude fiber (by difference) 4.9%, calcium (Ca) 0.0180%, phosphorus (P) 0.015%, iron (Fe) 0.0018%.

Calories.—0.2 per gram; 6 per ounce.

111
938

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

535 North Dearborn Street : : : Chicago, Ill.

Cable Address . . . . "Medic, Chicago"

Subscription price . . . . . Seven dollars per annum in advance

Please send in promptly notice of change of address, giving both old and new; always state whether the change is temporary or permanent. Such notice should mention all journals received from this office. Important information regarding contributions will be found on second advertising page following reading matter.

SATURDAY, AUGUST 20, 1938

THE NEED OF SPECIAL TRAINING IN THE DIAGNOSIS AND TREATMENT OF CANCER

The recent movement for the organization of cancer clinics is based on the principle that the best results can be obtained in the diagnosis and treatment of the cancerous diseases by formally organized and close cooperation between the pathologist, the surgeon and the radiotherapist. The personnel, the facilities and the equipment necessary for such cooperation can best be assembled and maintained only in special centers. Existing hospitals are, of course, the logical places for cancer clinics. Certain minimum standards for these clinics have been established by the American College of Surgeons including, in addition to the personnel and facilities, provisions for accurate records and follow-up services. Approved hospitals of 100 beds or more have been urged to consider the formation of cancer clinics.

The organization of cooperative services is necessary to obtain the maximum efficiency in the diagnosis and treatment of cancer. The highly expert and specialized nature of the diagnosis, the surgery and the radiation treatment inevitably requires the concentration of such services in special centers. Last year the American College of Surgeons carried on its approved list 240 cancer clinics, 144 of which are integral parts of general hospitals.[1] The number of approved and approvable clinics is increasing. Anticancer activities on the part of state departments of health will no doubt result in the formation of more cancer centers under similar auspices. Cancer is now accepted as a public health problem of the first magnitude. All cancer patients, those who cannot meet the cost as well as those who can, should receive the benefits of the best that can be done for them.

At the recent commemoration of the twenty-fifth anniversary of the American Society for the Control of Cancer, it was emphasized not only that the formation of cancer clinics should be furthered but that special training should be urged for physicians who wish to devote themselves wholly to cancer in their practice. Such specially trained physicians will be needed increasingly to carry on the modern diagnosis and treatment of cancer in public and private institutions. At present, eleven hospitals offering in all only thirty-four positions are approved by the American Medical Association[2] for "residencies in malignant diseases." Of these hospitals, services of thirty-six months are offered by one, of twenty-four months by one, of sixteen months by two and of twelve months by seven. Obviously the existing facilities for postgraduate training in the diagnosis and treatment of cancer are inadequate, but they could be greatly increased by comparatively little effort. Time should not be lost in organizing thorough and comprehensive courses in suitable medical schools and hospitals. The National Cancer Institute Act, approved Aug. 5, 1937, provides for the training and instruction of qualified physicians "in all technical matters relating to the diagnosis and treatment of cancer." Evidently the framers of the act recognized fully the great need for such training.

TRANSFUSION OF MASSIVE DOSES OF CADAVER BLOOD BY THE CONTINUOUS DRIP METHOD

S. S. Yudin,[1] first to introduce the use of cadaver blood for transfusion, has recently summarized the advantages of cadaver blood: (1) The amount of blood that may be obtained from a single donor is large; (2) it does not have to be paid for; (3) because of fibrinolysis which takes place in the blood of patients dying a sudden death, there is no necessity for adding sodium citrate solution; (4) the number of reactions is markedly diminished because of the absence of conserving fluids; (5) the Wassermann reaction is performed on the blood which is to be transfused, while the possibility of syphilis in a living donor is not always excluded, and (6) the necropsy which is performed on the cadaver before its blood is accepted guarantees the innocuousness of the blood, since it offers the opportunity of examining the donor for signs of tuberculosis, malaria, septic foci and secondary signs of syphilis.

The keeping of large reserves of blood for instant use in emergencies proved to be of definite advantage in the work of the Central Institute of Emergency Surgery at Moscow. Blood without admixture can be preserved

1. Hospitals in the United States and Canada Conducting Cancer Clinics Which Are Approved by the College, Bull. Am. Coll. Surgeons **22**: 35 (Oct.) 1937.

2. Hospital Service in the United States, J. A. M. A. **110**: 959 (March 26) 1938.

1. Yudin, S. S.: Drip Transfusion of Massive Doses of Cadaver Blood, Vestnik khir. **55**, February 1938.

for longer periods than blood to which preserving fluids have been added. The number of mild reactions in 2,000 transfusions of cadaver blood amounted to 5 per cent. Yudin is convinced that the effectiveness of cadaver blood is not in any way inferior to that of blood from living donors.

The report of Marriott and Kekwick,[2] working in the Middlesex Hospital, London, on the results obtained from administering massive doses of blood by the continuous drip method in cases characterized by a severe acute anemia and a lowered regenerative hematopoietic function, stimulated Yudin to adopt this method in his employment of cadaver blood in a group of similar cases. His experience with twenty-five cases of advanced cancer gave exceedingly encouraging results. Patients who were the poorest risks because of advanced cachexia and profound anemia could be improved before the operation by massive blood transfusions. The method was likewise applied in twenty-five cases of profusely bleeding gastroduodenal ulcers.

The method presents certain technical difficulties, the principal one of which is the tendency for the corpuscles to sedimentate and block the drip bulb. Marriott and Kekwick have overcome this difficulty by bubbling a continuous stream of filtered oxygen through the blood, thus accomplishing a continuous stirring. Another difficulty is the not infrequent occurrence of phlebitis in the arm. According to Yudin, the introduction of 0.5 liter of blood raises the hemoglobin of an adult by 9 to 10 per cent. Gravely exsanguinated patients may be given the first liter of blood in fifteen or twenty minutes. However, the tempo of transfusion after that must be slowed. It is not advisable to raise the hemoglobin content more than 10 per cent every four hours. This concerns particularly patients who are not bleeding and patients with sclerosis and hypertension. Ordinarily, from forty to forty-five drops of blood is transfused every minute, or from 100 to 150 cc. every hour. Doses as high as 6 liters may be given in the course of two or three days.

Despite the exceedingly good results obtained with the method, Yudin does not feel that this is necessarily the solution of the problem. He believes that the same results may be obtained by what he calls the fractional method. Thus, a patient may be given 500 cc. of blood before the operation and from 1 to 1.5 liters after the operation in a course of one hour by the usual method. Additional amounts of 500 cc. may be given every succeeding twelve hours two or three times. He sees here another advantage in the use of cadaver blood, namely that it requires a lesser number of donors, thus giving greater assurance as to the compatibility of the blood than when the blood is taken from living donors.

2. Marriott, H. L., and Kekwick, Alan: Continuous Drip Blood Transfusion, Lancet **1**: 977 (April 27) 1935.

INFECTIVITY OF CALCIFIED TUBERCULOUS LESIONS

Whether or not calcified foci from childhood infections with tuberculins are possible sources of endogenous reinfection in later life has been a disputed question for a half century. In 1884 Dejerine [1] studied calcified lesions in twelve tuberculous persons dying in the fourth, sixth, seventh and eighth decades of life. He failed to find tubercle bacilli in the calcified lesions. Material from four of these lesions was injected into guinea pigs with uniformly negative results. From these scanty data Dejerine concluded that the infectious agent disappears quantitatively from tuberculous lesions as soon as calcification is complete. Quite different results were subsequently reported by Rabinowitsch,[2] Schmitz [3] and others who tested the guinea pig infectivity of thirty-two calcified foci from human necropsies and obtained positive results in seventeen cases.

Doubt as to the reliability of previous conclusions was afterward expressed by Griffith,[4] who found that in 176 trials chronic tuberculous tissues failed to infect guinea pigs, although acid-fast bacilli were readily demonstrated by animal inoculation. By animal inoculation Opie and Aronson [5] demonstrated tubercle bacilli in apparently noninfected portions of tuberculous lungs, suggesting that the alleged infectivity of calcified foci was due to slips in technic or unavoidable contamination of the calcified area.

Since there is at present no unanimity of opinion as to the probable infectivity of chronic tuberculous lesions, Feldman and Baggenston [6] of the Mayo Clinic restudied this problem with the latest technical methods. Necropsy material was obtained from sixty-eight persons ranging in age from 7 to 90 years who had died from causes other than tuberculosis. Evidence of previous pulmonary infection with tubercle bacilli was observed in all cases, the presumptive childhood tuberculosis appearing as encapsulated, caseous or calcified areas in the pulmonary tissues or the tracheobronchial lymph nodes. These encapsulated lesions were excised and emulsified in sterile sand and the emulsions thus obtained planted on two or more particularly favorable culture mediums. From two to six duplicate guinea pigs were inoculated subcutaneously with 1 to 2 cc. of each sample. All animals that died within twenty-one days were discarded, death presumably being due to primary or allergic toxicity of the emulsion or to nontuberculous virus or bacterial infection. The surviving guinea pigs were killed at the end of from eight to fourteen weeks and meticulously examined macroscopically, microscopically and culturally for evidence of tuberculosis.

1. Dejerine, J. J.: Compt. rend. Soc. de biol. **36**: 500, 1884.
2. Rabinowitsch, Lydia: Berl. klin. Wchnschr. **44**: 35, 1907.
3. Schmitz, Eugen: Frankfurt. Ztschr. f. Path. **3**: 88, 1909.
4. Griffith, A. Stanley: J. Path. & Bact. **32**: 813 (Oct.) 1929.
5. Opie, Eugene L., and Aronson, J. D.: Tubercle Bacilli in Latent Tuberculous Lesions and in Lung Tissue Without Tuberculous Lesions, Arch. Path. **4**: 1 (July) 1927.
6. Feldman, William H., and Baggenston, Archie H.: Am. J. Path. **14**: 473 (July) 1938.

Positive results were obtained in only one of the sixty-eight chronic tuberculous foci studied. In none of the other foci was the presence of tubercle bacilli demonstrated by either cultural or inoculation methods. The authors concluded from this evidence that in the majority of cases the "primary complex" in tuberculosis passes through an involutional process unfavorable to the continued viability of Mycobacterium tuberculosis. In their opinion endogenous reinfection from definitely capsulated, sclerotic, caseous or calcified tuberculosis of childhood is unlikely to occur.

Current Comment

OUTBREAK OF GASTRO-ENTERITIS IN MILWAUKEE AND VICINITY

During February 1938, according to a report of the Wisconsin State Board of Health,[1] about 4.5 per cent of the population of Milwaukee was attacked by acute gastro-enteritis. The onset of an attack was usually abrupt and generally accompanied by nausea or vomiting and followed by abdominal pain, diarrhea or both. Vomiting usually subsided after a few hours, while diarrhea often persisted for from a few hours to a week. The stools of the patients had no striking characteristics. The incubation period, according to available evidence, varied from six hours to six days but most commonly was from one to two days. The outbreak apparently became definitely established about February 7 and waned after February 21. It involved surrounding communities as far north as Port Washington and as far south as Kenosha. Epidemiologic investigation served to eliminate in a reasonably satisfactory manner food and milk as a source of the outbreak. All the communities involved in the epidemic of gastro-enteritis with one exception obtained water supplies from Lake Michigan. The charting of the daily onset of the cases in relation to the turbidity of the water, raw water B. coli index, chlorine application, residual chlorine, wind direction, and similar factors revealed that the most unsatisfactory water condition existed during the period from February 11 to 14, when high bacterial counts, maximum B. coli index and maximum turbidity were reported. The outbreak coincided with the period of spring freshets; that is, the first heavy run off due to thaws and rains. This correlation pointed directly to increased pollution of the lake as the cause. The report concluded that the water facilities available in the city of Milwaukee at that time were inadequate for purification of water for an emergency of the kind experienced. Negligence could not be charged to the health and water works authorities, since chlorine residuals appeared ample at all times and the B. coli index of the tap water was well below the accepted treasury standards for a safe drinking water. Control of chlorination should be such as to assure at all times as effective sterilization as is possible with this process and to maintain the B. coli index below the indicated maximum of 0.2. Tests for residual chlorine should be made at definite intervals throughout each twenty-four hour day and should be such that color and turbidity will not result in false readings. From a bacteriologic standpoint it appears desirable that present procedures be modified so that it is possible to obtain a lower B. coli index with individual samples than is given by present methods. Should the water fail to meet the suggested tentative standards, the health of the consumers should be further safeguarded by the boiling of all drinking water.

1. Edwards, A. C.; Warrick, L. F., and Muegge, O. J.: Report of Investigation of an Outbreak of Gastro-Enteritis, Milwaukee and Vicinity, February 1938, Wisconsin State Board of Health.

VISUAL STANDARDS FOR OPERATING MOTOR VEHICLES

Recognizing the increasing necessity for greater care in the operation of motor vehicles on the highways, the House of Delegates of the American Medical Association at the recent San Francisco meeting adopted the following resolution. The standards set forth were developed by the Section on Ophthalmology, where this program had been under consideration for many years:

Resolved, That the following be accepted as the approved American Medical Association standards:

A. For an Unlimited License:

1. Visual acuity with or without glasses of 20/40 Sn. in one eye and 20/100 Sn. in the other.
2. A form field of not less than 45 degrees in all meridians from the point of fixation.
3. The presence of binocular single vision.
4. Ability to distinguish red, green and yellow.
5. Night blindness not to be present.
6. Glasses when required be worn while driving and those employed in public transportation be provided with an extra pair.

B. Visual Standards for Limited License:

1. Visual acuity of not less than 20/65 Sn. in the better eye.
2. Field vision of not less than 60 degrees horizontally and 50 degrees vertically from point of fixation in one eye.
3. Diplopia not to be present.
4. Glasses to be worn when prescribed.
5. Coordination of eye, mind and muscle to be fully adequate to meet the practical visual road tests.
6. A limited license not to be issued to those employed in public transportation.

C. Renewals, Retesting and Reexaminations:

1. Renewals of license to be issued at least every third year. The applicant shall with each renewal make a declaration that he knows of no visual defect which has developed during the past year.
2. Retesting of acuity to be made at least every six years.
3. If any visual defects have developed, an examination by an ophthalmologist and the report thereof, to be required before reissuing the license.
4. License to state thereon the specific limitation for driving.

ORGANIZATION SECTION

MEDICAL PROBLEMS IN MINNESOTA

JAMES M. HAYES, M.D.
MINNEAPOLIS

This era of depression and recession with its political and economic upheavals has necessarily complicated medical problems in this as well as every other state in the Union.

We were fortunate in Minnesota in having one of the best state medical organizations before the depression. Through this organization we were able to control the hysteria which seemed prevalent when federal finances first came into the state for aid to the needy sick. Dr. Chesley says that, in his thirteen years as head of the National Public Health Secretaries Association, never before has he seen so much outside interference in the practice of medicine as he has during the past four or five years.

There are about two and a half million people in the state of Minnesota. One-half million, or about one in every five, are now on some degree of relief. Practically none of these people are able to pay for medical care. About 50 per cent of them live in the rural communities, the other 50 per cent in the large cities.

Unfortunately the Twin Cities had long ago established the precedent of caring for the indigent sick without remuneration to the participating physicians. These are cared for mostly in the charity hospitals. In the past the burden was not so great, but the depression has made this burden almost unbearable. This situation should be changed, but so far the physicians have made no effort to have it changed and the public willingly accepts this free service. The same situation had existed in Chicago, but in 1936 the physicians there received nearly half a million dollars for their services in caring for the indigent sick.

In the rural communities the proportion of indigent is so great that it would be impossible for the physician to survive if he did not receive some remuneration for the care of these indigent sick. Accordingly, a minimum fee has been established for the care of these patients in the rural districts.

Our state medical association, as well as every unit throughout the state, feels that it is our duty to render to every sick person the best possible medical care regardless of his financial status.

Since federal aid first came into the state at the beginning of the depression, federal, state and county committees have spent many hours in an attempt to work out plans for the most efficacious care of the indigent sick.

Last year federal funds ceased to come in for direct relief. Since then the county, with assistance from the state, has taken care of all direct relief patients. The Works Progress Administration, a federal project, still exists. Those on direct relief who are able to work may be employed by the WPA. They receive a fixed salary from the federal government; this usually covers ordinary medical care. On Dec. 31, 1937, there were 182,896 individuals employed by the WPA. Other federal agencies are the Farm Security Administration, National Youth Administration, CCC camps and Veterans Administration. The Farm Security Administration is making plans to finance medical care in connection with farm security loans. At present there are about 34,000 such persons in this state. Under the National Youth Administration, supplemental medical aid may be granted by county boards from direct relief funds in case of need. At present there are about 13,651 such youths. The CCC camps are taken care of medically by army medical reserve officers assigned to these camps and paid an annual salary. At present there are about 9,000 in such camps. Under the Veterans Administration the medical care is in charge of the Veterans Bureau. Those with service connected disabilities or, if indigent, with non-service connected disabilities, are cared for at federal expense. This one service is, unfortunately, much abused. There are about 11,000 now under such care.

The State Relief Agency is responsible for all those on direct relief. Up to about one year ago federal funds were available for this purpose, but since that time this relief has been administered by the eighty-seven county welfare boards of the state. The county funds are supplemented by state funds as determined by the State Relief Agency and the county boards. On Dec. 31, 1937, there were 152,854 on direct relief.

The State Board of Control is one of the important state agencies. This board has charge of the social security aids to the needy with the exception of federal old age assistance, unemployment compensation, maternal and child health services, and public health. Specifically, this board directs old age assistance, aid to dependent children, aid to the blind and services to crippled children. Funds are supplied by the federal government either outright or in matching state funds. Old age assistance is a monthly cash payment. The maximum amount per person is $30 a month. This is paid only to the needy of 60 years or over who do not qualify for federal old age benefits. The county welfare board ordinarily determines who shall be granted this assistance and may be called on for financial assistance in emergency or special medical care. There are about 62,357 such persons in the state at this time. Mothers' aid and aid to dependent children is given when the county welfare board determines they have no other adequate means of support. There are at present 11,512 mothers and children on such relief.

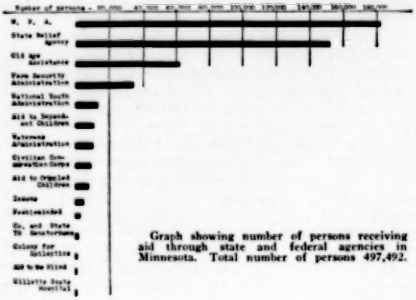
The State Board of Control dispenses special funds for the care of children in need of specialized care. This fund is available only for children with special physical or mental diseases which may be benefited by special treatment. The state board may and often does use private charities of various kinds in the care of these patients. Aid to the blind takes the form of a monthly cash payment. The degree of blindness as well as the financial status of the patient determines the degree of financial assistance. The County Welfare

President's address, read before the eighty-fifth annual meeting of the Minnesota State Medical Association, Duluth, June 29, 1938.

111
938

Board, with the assistance of a special ophthalmologist, determines who shall receive this assistance and how much. Nearly 500 out of 3,300 blind in Minnesota today receive such assistance.

Perhaps no class among the indigent sick or disabled receive more attention and adequate special care than do the crippled children. Dr. Hilleboe, the medical man



Graph showing number of persons receiving aid through state and federal agencies in Minnesota. Total number of persons 497,492.

on the State Board of Control, has supervision of this as well as all other medical work under this board. It is estimated that there are nearly 10,000 crippled children under the age of 21 in Minnesota today. Everything known to medical science is employed in the care of these patients to cure them and render them useful citizens. Diagnostic clinics are held throughout the state at accessible points, where diagnoses, consultations and follow-up examinations may be made. Public health nurses are sent out to assist in every way possible. They help to locate new cases, organize clinics, administer physical therapy when directed, and see that the patient carries out specially prescribed treatment. The State Board of Control provides medical and hospital care for these patients from a special fund.

All state institutions come under the supervision of the State Board of Control. These include the feebleminded, of whom there are 2,320; the insane, numbering 5,684; the tuberculous in county and state sanatoriums, 2,097; the Gillette State Hospital, now containing 221 patients, and the colony for epileptics, of which there are 1,104.

THE MINNESOTA DEPARTMENT OF HEALTH

The Minnesota Department of Health confines its work largely to prevention and control of disease. In carrying out this duty, it is necessary to train a large personnel who supplement and assist in the work of the practicing physician to a high degree. Through this organization the practicing physician is able to increase his efficiency in preventive medicine. To promote maternal and child welfare, postgraduate courses are held throughout the state. These courses are given by physicians highly trained in these specialties. The public health nurse comes in here to great advantage in assisting at these clinics and collecting the mothers and infants who especially need attention. The Public Health Department has long done yeoman service in the prevention of disease. Recently its efforts have increased many times. It has made it possible for physicians from all parts of the state to have all cases of pneumonia readily typed and, when possible, furnish serum for the treatment of this disease.

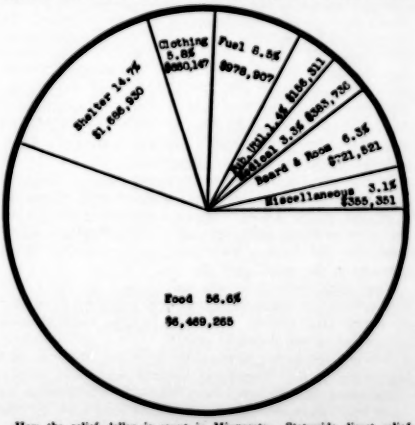
In conjunction with other medical organizations of the state, it has entered into a program of public education and control of venereal diseases. With renewed vigor it has promoted diphtheria immunization, smallpox vaccination and typhoid control. In combination with other health and medical organizations, it has established a program in Minnesota for the education of the public and the care of tuberculous patients that cannot be surpassed by any other state in the Union.

In addition to the federal, state and county agencies for medical care and prevention of disease, we have several important private agencies.

The Public Health Association collects large sums of money through the sale of the Christmas seals. These funds are used chiefly in the prevention and control of tuberculosis. They supplement the work of the aforementioned organization in tuberculosis work.

The Woman's Field Army for the Control of Cancer, together with the Cancer Committee from the State Medical Association, sponsors a program for public education in the need for early detection and treatment of cancer. The Association for Crippled Children and Adults sponsors a program for education concerning needs of crippled children and adults, particularly for training in handicraft.

The American Legion and Auxiliary are doing much in aiding the underprivileged child. They are just now sponsoring a campaign of educating and persuading the veteran to have a yearly physical examination.



How the relief dollar is spent in Minnesota. Statewide direct relief, year of 1937, $11,423,379.73; drought relief $215,827.48 is in addition to this amount.

Parent and teacher associations conduct a summer round-up of preschool children. Under this program these children receive a physical examination, and defects thus discovered are corrected if possible.

In listening to this discourse, one would naturally think that we have many overlapping agencies. Perhaps it would be simpler and possibly more efficacious to have all this health and medical work under a single supervisor.

Most of these organizations have been in existence for some time. Each has had a personnel trained for special work. Each has fitted well into the general plan now in operation. All are cooperating now with such a high degree of efficiency that perhaps no state in the Union has a better plan for caring for the indigent sick or disabled.

Amount Spent for Luxuries and for Medical Treatment

Motor car	$150.00
Tobacco	67.00
Candy	37.00
Drinks and chewing gum	34.00
Radio and music	25.00
Physicians' fees	24.00

All will agree with me that, in the last analysis, matters of prevention and cure of disease must be directed and controlled by the practicing physician. The responsibility of direction and control of all this work must necessarily fall on the shoulders of our state medical association. To those who have held the reins in this organization in the past, credit must be given for having perfected this organization to the point at which it has been able efficiently to cope with all these difficult problems. We are convinced that little could be desired in improving the friendly cooperation we receive from all other organizations who take any part in the prevention and cure of disease.

The University of Minnesota, through its regular medical staff, has given much assistance to the practicing physician. The unique establishment of the continuation course in medicine at the university under the direction of Dr. O'Brien has been especially comforting to those who wish to go back to school and increase their knowledge of the latest developments in medical science.

So far I have spoken almost entirely of the indigent sick. Much has been said of the neglect of the near indigent or the low income group. Those who thus complain usually know little of the actual situation in the medical care of this class.

In Hennepin County we have established the so-called Medical Service Bureau. The main purpose of this organization is to care for any of this class whose income is just above that of the indigent class. This is an adjunct of the Hennepin County Medical Society. Members of the Hennepin County Medical Society have expressed a willingness to care for these patients for whatever they are able to pay. All relief agencies, charity hospitals or other charity organizations are requested to refer to this bureau any patients who apply for free medical care but who are not eligible because their income is slightly above that required for eligibility. During the years 1936 and 1937 only 147 patients applied to this bureau for care. The great majority of those thus referred went back to their family physicians, by whom they had been taken care of for years for little or no financial outlay. Contrary to reports, these patients are charged very little by the physician and they usually take plenty of time to pay, so that the burden is not so great as some informers would have it appear.

Complaints have been registered that portions of the state are inadequately supplied with physicians. A few years ago complaints came from the northern part of the state that certain patients in that area had died because they were unable to obtain medical care. This complaint came to the State Board of Control and was passed on to us. A committee from the State Medical Association was sent to Bemidji one Sunday to investigate the situation. We called in physicians and others concerned. We found that none of these patients had suffered because of inaccessible physicians but rather because they did not avail themselves of the medical care at hand or refused to follow medical advice given them.

Even in the most isolated areas, physicians never failed to go when called. One of the cases cited was that of appendicitis. The patient visited the doctor and was advised to go to the hospital. Instead, he went home and failed to call the doctor until he was on the verge of death. In another instance the patient had diphtheria and failed to call the doctor until late complications had set in. The doctor visited him and administered antitoxin but the patient died as a result of complicating diseases.

We were unable to see how any other possible distribution of physicians could have given any better results.

Recent reports of the Committee on Costs of Medical Care, the American Foundation for the Study of Medical Care and the Committee of 430 Physicians have given the public the impression that the medical profession is having dissension within its ranks. Of course there is always some dissension, but this is mostly because those who have never really treated the sick have taken it on themselves to tell the practicing physician how to practice. Some of the farm papers of the state have taken these remarks seriously, thus adding fuel to the flame. A radio speaker in Wisconsin, representing labor unions, spread the news over that state and Minnesota that the Committee on the Costs of Medical Care has shown that 46 per cent of those with a salary below $1,200 and 42 per cent of those

Agencies Interested in Medical Aid in Minnesota

State Agencies	*Federal Agencies*	*Private Agencies*
State Board of Control	Works Progress Administration	Minnesota Public Health Association
1. Department of Public Assistance: Old Age Assistance; Mothers' Aid and Aid to Dependent Children; Aid to Crippled Children; Aid to the Blind; Fund for Child Welfare, Special Cases	Farm Security Administration	Women's Field Army of the American Society for the Control of Cancer
2. State Institutions: Feebleminded; Insane; County and State Tuberculosis Sanatoriums; Gillett State Hospital; Colony for Epileptics, Cambridge	National Youth Administration	American Social Hygiene Association
Minnesota Department of Health	Citizens Conservation Corps	Minnesota Association for Crippled Children and Adults
1. Division of Child Hygiene: Maternal and child welfare program (Postgraduate courses) for physicians financed by Social Security funds. Public Health Nursing	Veterans' Administration	American Legion and Auxiliary
2. Division of Preventable Diseases: Pneumonia Control program; Venereal Disease program; Diphtheria Immunization, Smallpox Vaccination and Typhoid Control programs; Tuberculosis program		Parent and Teacher Associations
3. Public Health Units in Bemidji, Duluth and Mankato. Also, a Chippewa Indian health unit.		Visiting Nurses Association
4. Public Health education.		Private charities, including Catholic, Jewish and Lutheran charities
State Relief Agency		Fraternal organizations
		Minnesota Hospital Service Association
		Red Cross

with a salary below $2,000 receive no medical care. Their information is false and misleading in that they have not shown need for medical care in these people. If some of them had practiced among these people they would realize that they usually have medical attention when they need it. I think I can frankly say that the majority of physicians in this association practice among this class the greater part of our time and know that these statements are false. Critics have not shown and cannot show that, under the panel system of England or any governmental system of medicine, do people in this class apply any more readily for medical care. The average physician knows that the patient does not stay away from the doctor because of cost but rather from negligence or fear of being told he has some serious condition.

The Minority Report of the Committee on the Costs of Medical Care indicates the impracticable suggestions of the Majority Report. The Majority Report gives the public the impression that the physician is receiving this large amount of money, when in reality this amount includes the cost of hospitalization, nursing care, dental care and all expenses entailed by the sick patient. An analysis of their figures shows that the physician received only 29.8 cents of each dollar. If they had given a comparative study of other expenses and especially that for luxuries, their conclusions would have seemed more just.

Dr. Scammon of the University of Minnesota has made such a study, which shows the amount spent by the average family per year for luxuries as compared to medical expense.

In addition to this, 125 million dollars is paid annually to various healers other than physicians, and 350 million dollars for "patent medicines." He has also shown that state medicine in Minnesota alone during the year 1934 would have cost $20,000,000, or one-half the entire state tax levy.

Germany today has a completely government controlled system of medicine. The death rate in Germany is 12.3 per thousand of population, while in the United States it is 10.7 per thousand. Today 40 per cent of the money paid out for medical care in Germany goes to politicians or lay supervisors, while only 60 per cent is received by the physician, who must assume all the responsibility for the care of the sick patient. Patients taken care of under this system will readily say they do not desire it, and statistics show that patients do not go to the physician any more readily than under our system.

The various committees mentioned have obtained their information from improper sources and therefore have arrived at incorrect conclusions.

The Board of Trustees of the American Medical Association has instituted a general medical survey of the entire United States. This survey is of great importance because it is being conducted by the only group of men capable of making such surveys of any value.

The practicing physician with the county as the unit will give the best possible information. This survey has already begun in the various counties of this state and the response from the physicians is encouraging.

There are always a few in this profession, as in other walks of life, who are anxious to try some new experiment. Those who favor government control of medicine know little of the actual working of government medicine from the point of view of the sick or the cost to the government. The so-called Medical Guild, or the system under which we practice medicine today, has existed for over 500 years. It has withstood the attacks of ambitious politicians and other outside aggressors and has satisfied the properly informed man that no better system has yet been proposed.

There is nothing in this system that will not lend itself to the most scientific advances, nor will it in any way prevent us from accepting any reasonable outside assistance from the federal government or from philanthropic individuals or organizations. We do not claim anything like perfection in this system, but we do defy any other profession or group of individuals to show greater activity in an attempt to better their work individually or as a group.

953 Medical Arts Building.

BEWARE OF FALSE GODS!

An Editorial from the Kansas City Medical Journal, August 1938

If you are not familiar with the impending investigation of the A. M. A. at Washington, it is just that you have not read the recent issues of your own J. A. M. A. or you have not picked up the papers from the front lawn. The build-up of the government to dissipate and dilute the influence of the A. M. A. is showing progress in all directions. Members who have never participated in the organization and progress of the medical profession have been uncovered and minority groupings in different thought channels have been encouraged to display their antipathy. The barrage has been amplified by attacks from different bureaus and departments of the government. The scare and the threat of the law and the grand jury has not been overlooked.

The unfortunate part about the present situation is that while all of these attacks have some small elements of fact, when combined they tend to obscure the great values for the good of the whole people which organization in the profession has established. Enough wolves nipping at the heels and annoying a strong man will wear down any enthusiasm for existence.

One may declare a vacation for tradition for a period of time. One may wink at ethics for another period. One may argue that public policy demands a cessation of standards. Some may insist that it is not necessary to balance the science and the art of medicine. There is no doubt but that you can tear down the structure of better and honest medicine in America if the fitness of change in the house of medicine is not judged by the profession itself. It is notorious that laymen are not able to choose medical attention or rather health attention by any measure of their judgment.

Only as the medical profession, through organized medicine and the A. M. A., has erected standards of medical education, eliminated quackery, qualified specialists and criticized hospital methods, etc., has the quality of medical practice of America developed. There has never been any police power to the A. M. A. There have never been any laws conferring any measure of penalty or legal action by the A. M. A. There has never been any big boss such as other groupings in business and sports have devised.

All of the progress of American medicine has been through the better education of physicians, through the moral persuasion of the Councils of the A. M. A. and through the traditional application of ethical standards. Such means are bound always to have more weight than mere laws. Public opinion has supported these various items of progress and gradually the quackery and charlatanism of America has faded into disrepute.

Medical schools with their huge establishments may feel that they are peculiarly fitted to practice mass medicine with governmental subsidies. Large non-profit metropolitan and even smaller hospitals may feel that they are ordained through the merit of their physical establishment to be the center for medical and health needs of their communities.

These modern factors of civilization and progress are prone to forget that it is really the personality and peerage of their medical staff that establishes their fame and their clientele. It is now apparent that even the physicians who staff such institutions sometimes arrogate to themselves an unusual ability to serve the people. Physicians in groups promptly believe that in their small union rests the locum tenens of Aesculapian lore.

All these things may be true. But one must realize that only a small minority of all the people can take advantage of such institutions and such groupings. The great majority of people scattered over the country must be taken care of by the physicians of their locality. The quality of such medical care can only be maintained by supporting the progressive type of physician who keep up with the times and who does not indulge in unethical methods or tamper with traditional items of good medical manners. It is further maintained by a better distribution of well educated physicians.

These factors of medical progress are maintained by the inherent good will and the promotion of better standards by the Councils of the A. M. A. and other national medical organizations. If you dissipate the influence behind these standards, you are cutting out the foundations that are responsible for better medicine for all the people in America. One should not listen to the sirens who will cheer on those who are willing to scuttle the ship. Hold fast to those things that are good! Beware of false gods!

E. H. S.

HEALTH PROBLEMS IN EDUCATION

SECOND SYMPOSIUM, HELD AT SAN FRANCISCO, JUNE 14, 1938

DR. ROBERT T. LEGGE, BERKELEY, CALIF., IN THE CHAIR

The Second Symposium on Health Problems in Education was arranged by the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, with the cooperation of the following sections of the Scientific Assembly of the American Medical Association: Section on Pediatrics, Section on Ophthalmology, Section on Laryngology, Otology and Rhinology, and Section on Preventive and Industrial Medicine and Public Health. The first symposium on Health Problems in Education was held during the annual session of the American Medical Association at Atlantic City in 1937 and was attended by approximately seventy-five persons, mostly physicians. The second symposium was largely attended by teachers and school administrators, some 300 in all.

The speakers presented their own opinions. These do not represent the policies of the American Medical Association, except as they coincide with the policies of the Association expressed by the House of Delegates.

Abstracts of the papers presented follow. The discussions have been omitted. Complete papers, and copies of the discussions so far as they were submitted in writing by the speakers, will be furnished in mimeographed form, gratis, to physicians and educators on application to the Bureau of Health Education of the American Medical Association.

LOOKING BACKWARD IN THE SCHOOL HEALTH FIELD

THOMAS D. WOOD, M.D.
Professor Emeritus of Health Education, Teachers College, Columbia University;
Chairman, Joint Committee on Health Problems in Education
NEW YORK

Foundations have significant value for edifices built on them. School health work is of comparatively recent development. Greeks and Romans had ideals of sound mind in the sound body which have not been surpassed, perhaps not been equaled. The Middle Ages produced nothing significant for adequate recognition or care of health. School health work is a nineteenth century, Old World development beginning in France in 1833. Significant progress was made in Wales in 1848 in the school lighting and ventilation and the appointment of a medical attendance officer. Later contributions were made in 1866 in Breslau and in 1874 in Brussels, where the first system of medical school inspection was established. School health work in America began in Boston in 1875 with records of height and weight. In 1877 dental service was established in Belgium; in 1822 the first school physician was appointed in Egypt. The first school nurse was appointed in England in 1887 and the first school physician in 1891. A regular system of medical inspection was established in Boston in 1894, and New York appointed 134 school physicians in 1897. Local boards of health controlled and administered the early school health work. Wiesbaden in 1896 organized a very comprehensive program of health work in the schools. School health work was promptly accepted by parents. Connecticut in 1899 passed the first state law requiring teachers to test eyesight every three years and since that time many states have passed laws relating to school health services and health education, but many such laws have ended in futility because the funds were not provided for very effective administration. Commercial organizations have attempted to utilize school systems for commercial purposes, but some worthy contributions to school health education have been made, especially by life insurance companies. Special contributions from voluntary sources include those by the American Child Health Association, the White House Conference on Child Health and Protection and the Joint Committee on Health Problems in Education.

RELATIONSHIPS OF HEALTH SERVICE IN THE SCHOOLS TO HEALTH EDUCATION AND THE GENERAL CURRICULUM

EDNA W. BAILEY, PH.D.
Associate Professor of Education, University of California
BERKELEY, CALIF.

One of the impressive facts about the practice of medicine is the indisputable authority of the physician in relation to his patients. Wherever the physician sits, there is the head of the table, no matter if the table be education and not medicine. Thoughtful and competent physicians do not feel themselves to be experts in all the fields. Able men and women in education do not count themselves authorities in medicine. There is an awakening to the significance of the relationships of health service to all other school activities. Health service is still the alien aristocrat, miracle working, incomprehensible, to be handled only with careful insulation against its powers. If health personnel should be admitted to a real share in educational enterprise, education might be exposed to shocks and changes of a most disquieting character. Recent studies by the Joint Committee brought forth emphasis, especially by parents and school executives, for the need of medical judgment with regard to health education, especially the choice of topics, validation

of information, and maintenance of sane balance. Relationship of health service to health education is to build up an appreciation of medical, dental and nursing care. Definite and specific instruction is the purpose of procedures in the school health service. School physical examinations may be provided for the purpose of getting everybody examined or as an educational demonstration involving a few volunteers. A usable vocabulary of health terms is necessary in general health education as well as in sex education, where its importance has been demonstrated. Health service must include the private physician as well as the public health worker. Close relationships between medicine and education are of far-reaching significance. In our schools, future citizens may be taught the dignity, worth and incalculable human usefulness of the art and science of medicine, by intelligent cooperation between the physician and the teacher. In the physician's office and at the bedside of his patient, the physician may learn wherein schools are doing right and beneficial things for children and wherein they are making sorry blunders.

THE PHYSICIAN'S CONTRIBUTION TO EDUCATION

The Educator's Point of View

GEORGE A. RICE
Principal, University High School
OAKLAND, CALIF.

There is no even, regular contact between the physician and most of the people. Few school children can name a family physician. For many years educators have been saying that health is one of the goals of education, but they have done little about it. I know of no adequate health program in a public school today. Physicians need to know more about schools. Many services can be given by schools to students with health handicaps. One such is a convalescent room with beds, lounging chairs and other conveniences, with a teacher in charge; such a room is to be found at University High School, Oakland. Many physicians make use of this to get children back to school, but not on the regular program, more quickly. The most important factor in the health service is the interest teachers have taken in health. Teachers can be taught to find the most obvious health handicaps, but how to work out the machinery for the care of handicapped children is another matter. In University High School, students are referred to the convalescent room from the following sources: attendance office, classroom teachers, students themselves who fear they have weak hearts or tuberculosis, school physician follow-up, parents direct, candidates for health certificates for extracurricular activities, such as athletics, and from school officials who wish to protect the school against liability for injury to students engaged in activities connected with the school. Out of the health service program has grown a surprising list of adjustments that may be made in the school load: short days, light academic programs, lightened extracurricular programs, modified physical education programs, modified school routines, modified classroom procedures, lightened assignments of work, financial assistance, delayed graduation. About 30 per cent of the boys and 45 per cent of the girls are referred to the convalescent room. A report by letter is made to physicians of the activities of the school, curricular and extracurricular, and the physician's advice as to modifications for his patient is asked. Physicians are using these opportunities frequently and helpfully. Physicians give more information than they formerly did to the school, stating not only a wish that a student be excused from physical education but giving information on which to base a modified program; this does not mean disclosing any information which should be privileged. Cooperation between the school and the private physician has been promoted by establishing and maintaining ethical relationships. The school never makes a contact with the physician without the consent of the parent. No child is ever programmed for an activity which a physician has said might be harmful. The school never recommends a specific physician. Physicians and schools are both concerned with the health of children. Has not the time come for a more cooperative attack on the problem?

THE PHYSICIAN'S CONTRIBUTION TO EDUCATION

The School Physician's Point of View

ARTHUR E. WADE, M.D.
Director of Health, Seattle Public Schools
SEATTLE

Children become adults. Never before has youth needed such rigid preparation for life. Educators are concentrating all their abilities and mobilizing all their forces in an effort to meet this exigency. Vocational schools, special schools for the physically handicapped and guidance departments are being instituted and the recognition that health is prerequisite to learning has become accepted. The medical profession has been asked for contributions to this work and is responding. Full-time health departments exist in the public schools of larger cities and part-time medical services in the schools of smaller cities. School physicians have been in the schools for forty years. The full value of their contributions and their degree of success depends on interest and cooperation by the medical fraternity. Special schools exist for sight saving, hard of hearing, open air, crippled children, opportunity, slow moving, and home teacher. Social and educational misfits call for individual guidance and counsel. The objective is that status which results from a healthy body, a clear thinking mind and a fund of knowledge concerning one's environment which may be used for personal comfort and social, business or spiritual success. In medicine, as in education, the whole individual is considered and the ultimate goal in both is successful living. Education and medicine have developed independently but have come together in final conclusion. Without controversy these two professions should now unite in complete understanding and with loyalty to a common cause. During the forty years in which doctors have assisted the schools their contributions have developed from sanitation and contagion to include physical defects and their follow-up toward correction, and now it is recognized that physical strains, especially those of physical education, might cause injury to some children. A new type of physical examination is designed for the appraisal of physical capacity. The health of children is in the hands of physicians. The school physicians and the school nurses, as a transfer of qualified physicians and nurses from private practice to school medicine, are a contribution from the medical fraternity. They are representative of the medical profession and to them is given a tremendous field of privilege. School medicine is becoming a specialty for which young men will soon train; graduate courses are now appearing in a few medical schools. It is of vital importance to the medical profession that qualified personnel carry to youth in the schools a modern and authoritative health program. Physicians in every community should answer the educators' invitation by exhibiting personal interest in the schools. School health departments need no longer operate under the personal opinions of individual health directors or under the prejudices and customs of local communities. Studies have been made by the White House Conference on Child Welfare, the American Academy of Pediatricians, the American School Health Association and other groups. School medicine is rapidly taking a position of supreme importance as the only agency through which state health laws, public health and private physicians can communicate with the schools regarding the physical welfare of school children. School medicine is the physicians' contribution within the schools. The private physicians' professional services and advice relative to health and mental capacities of the pupils are their contributions outside the schools. The work should be divided into two fundamental divisions:

(a) What shall be performed within the schools:

1. All services which render the schools safe places for children.
2. Assistance in the control of infectious diseases.
3. Periodic health examinations of pupils.
4. Administration of first aid.
5. Preathletic or physical education examinations.
6. Supervision of subject matter in health sources.
7. Counseling with all health groups akin to the schools.
8. Conveyance of medical information to the schools.
9. Consultations relative to alteration of individual school programs.

(*b*) What shall be performed outside the schools:

1. All complete diagnoses, with view of treatment.
2. All treatment, except first aid.
3. All family and personal physician consultations.

The inference in this division of services is that the physician's contribution to health education is best delivered when a division is harmoniously agreed on whereby the private physicians conduct outside the schools all treatment except first aid and the schools conduct all services in making the schools safe places, in establishing healthful living, and in assuming the responsibility for health education of children. The educators have requested the physicians to unite with them in the preparation of youth for life. The physicians are responding. Their contribution is formulated. It only awaits final agreement on methods of administration before it becomes unleashed to fulfil its mission in placing the powers of physiologic youth at maximum receptivity and development.

THE PHYSICIAN'S CONTRIBUTION TO EDUCATION

The Practicing Physician's Point of View

BURT R. SHURLY, M.D.
DETROIT

Since the Civil War an expansion of educational opportunities has been witnessed for each generation. It was formerly unusual to find a college graduate. Now college has become the ordinary expectation of a vast number of boys and girls. The medical profession was for many years in advance of the average sphere in education of the rank and file of our people. The old family doctor had great influence with his clientele in the determination of the choice of a vocational career. He was a preceptor, guide, counselor, friend and beloved companion of the young people. He had their confidence and respect. His influence extended to the church, to public officials, to school teachers, and to public health when no health officer existed. With the inroads of specialism, the old influence waned and has been succeeded by the newer psychology, where the specialist knows what he knows and may know little else as it applies to the progressive requirements of education and to the broad cultural fields of modern life. Where we find a practicing physician serving on the school board, we find a valuable asset to the educational field. The physician can fit into the picture and produce an enormous amount of good in counseling and outlining the daily physical care of the school child. His function as an observer of life with broad common sense and scientific knowledge can have widespread applications. Schools are responsible for the child only during school hours, but these comprise a considerable portion of the day. Ethical problems, such as relation of the family doctor to the school authorities, include the consideration of the practicing physicians and the parents.

The Detroit school system maintains a special card index for each of the 286,000 pupils in its public schools. This blank card is sent annually to every parent, asking for the name, address and telephone number of the family physician; between 70 and 90 per cent have complied. Two members of the school board are physicians and surgeons, one member is the father of a physician and another is the son and brother of a physician. School doctors and nurses are appointed by the department of health, but a splendid working agreement exists without friction. The practicing physician whose name is on the pupil's card must not have his family taken away from him by any interference or advice given without consultation with him. He is entitled to participation in all discussions regarding the child's health. It is of paramount importance that contagious or infectious diseases be recognized in their earliest stages. Teachers cannot be diagnosticians, but they can note pupils' symptoms, such as fever, sore throat, nausea or vomiting, rapid pulse, chills, bad breath, lassitude, malaise or other symptoms. The child is sent home, to be seen by the family physician, who in many instances has already vaccinated the child against smallpox and used other preventive measures which have been found of value. By cooperating with the family doctor, he is made a sympathetic adviser. The medical profession, like the great human family in general, has its percentage of cranks, extremists, men without scientific ideas and those who have allowed notions to encroach on their qualities of good sense and medical balance; these become special problems in diplomacy, and herein lies the value of a complete understanding between the practicing physician and the school authorities. When and where such an understanding exists, the practicing physician is making a great contribution to education. One of his major contributions is the encouragement of periodic health examinations for all pupils in the schools. He can further throw his support behind programs designed to improve the diet of school children and to further the employment of tuberculin testing, x-rays, and other methods for the early detection of disease. Education is constantly being challenged by those who wish to reduce taxes, regardless of the cost in human welfare and human happiness. Widespread education is an absolute necessity if democratic society is to persist. Much can be contributed to education by mutual understanding between the practicing physician and the principals and teachers.

BETTER VISION FOR SCHOOL CHILDREN

C. S. O'BRIEN, M.D.
IOWA CITY

Care of the eyes with conservation of vision is an important health problem in college students. During this educational period though, many young people discover that all is not well with the visual organs; poor vision and other signs of eye strain often appear for the first time. In a recent report by the Eye Health Committee of the Student Health Association, it is stated that of 1,250,000 college students in the United States an estimated 15 to 25 per cent enter college with more or less serious ocular defects and many more develop during the college courses. In most schools there are no particular visual requirements. Even when a physical examination is made the examination of the eyes is quite cursory, discovering only gross defects; for example, myopia, high degrees of astigmatism, congenital anomalies and advanced diseases of the eyes. Hyperopia, moderate astigmatism, muscle imbalances, disorders of accommodation or convergence and other defects which affect sustained close work were not detected. In many colleges and universities little attention is given to the lighting of dormatories, fraternity houses, sorority houses, libraries, classrooms and laboratories. No attention is ordinarily paid to the instruction of students in conservation of vision with special relation to eyestrain, adequate lighting and proper posture. Admittedly utopian is the idea of a complete examination of the eyes, with refraction under a cycloplegic for all entering students and at the beginning of each successive school year. In addition, the pupils should be educated as to proper lighting, posture, symptoms of common eye defects, muscle imbalances and general care of the eyes. A beginning, no matter how small or apparently insignificant, should be made toward such a goal. It might be made by the universal adoption of a standard visual test for all entering students and its repetition each year. If all schools adopted the same type of Snellen chart, a common distance, and standardization of the illumination at from 7 to 10 foot candles, data would soon accumulate which would be of value in statistical studies and in the determination of further steps in ocular conservation. Such testing could be done by a physician or by a trained technician. It could be carried out by almost any school. The next step is one which many schools could easily take but which many more would find difficult; that is, an external ophthalmoscopic examination of the eyes, which must be made by a physician who has had ophthalmic training. The desired end is a complete examination of the eyes, including refraction under an adequate cycloplegic by a trained ophthalmologist. At present only a few schools could do such a thing, namely those with a college of medicine, with a strong department of student health or with adequate funds to employ trained ophthalmologists. An alternative is a requirement that each student present as a part of admission creden-

From the Department of Ophthalmology, State University of Iowa College of Medicine.

tials a certificate of recent date from a competent ophthalmologist setting forth the condition of the eyes. For those who could not otherwise afford it, the examination could be made by a physician employed by the school. Accurate records should be kept of all tests. If lighting is inadequate, measures should be taken to rectify such defects in libraries, classrooms and laboratories as well as dormatories, fraternity and sorority houses and rooming houses in general. Two or three easily understandable lectures might be given to entering students on simple ocular hygiene and the requirements for adequate lighting; thus students could be made to understand the symptoms arising from defective eyes and the importance of conservation of vision and reasonable care of the visual organs.

HOW SHALL SEX BE TAUGHT IN THE SCHOOLS?

THURMAN B. RICE, M.D.
Professor of Bacteriology and Public Health,
Indiana University School of Medicine
INDIANAPOLIS

It is expected that the schools shall help the home to prepare the child for the problems of life. The most difficult and important problems in life are those which have to do with sex. A large percentage of marriages are unhappy and many of them end in separation and divorce; many young people do not know how to go safely about the important project of choosing a marriage mate; sexual perversion is apparently on the increase; illegitimacy and criminal abortion are all too common. It would be better for one to fail in everything else and to succeed in his home life than to succeed in everything else and fail in his home life.

Sex must be taught as a pure, fresh, wholesome and perfectly legitimate phase of life. We are not required to apologize for it. There is but one place where sex is best taught; that place is the home. Mothers and fathers who do not accept their obvious duty in this respect are guilty of very serious neglect. The instruction of the child should begin long before he or she starts school by answering truthfully, all questions and by correct habit formation and the building of good mental and moral patterns as a by-product of wholesome home life. Many homes will not as yet accept that responsibility.

Perhaps the church should step in, but many who need such instruction have no church connection and in many churches instruction is merely to "behave oneself." Y. M. C. A.'s, Y. W. C. A.'s and other youth groups reach too few persons and at too late an age. The schools then must undertake this function but will probably never do it really well because it gets the children too late; it must teach children of the widest variety of cultural, ethical, economic, moral and religious backgrounds; it will run at cross purposes to the teaching of the parents and spiritual advisers; a very large proportion of the teachers are unmarried persons whose understanding of sexual problems is either academic or illicit; there are two sexes to be taught and two sexes to do the teaching. Schools should teach sex only because it is absolutely necessary and because no other agency seems to be doing it.

Sex education should be integrated throughout the entire school course and on the basis of home life as a unit which will allow sex to be taught through arithmetic (home budgets), geography, history, nature study, science, physical education, agriculture, gardening, economics and hygiene. It must be suited to the age of the child and as far as possible individually, and great care must be taken not to whet the appetite. Students should not be unnecessarily and conspicuously separated on the basis of sex for the purpose of giving sex instruction. Sex instruction must never be morbid with relation either to pain and danger of childbirth or to danger of disease. Mere anatomy and development of the reproductive organs is not sex education at all. The emotional side of the subject must not be neglected. The individual who regards sex from the proper emotional angle can almost always be trusted. Sex education cannot answer every question but must show the child the way to learn the truth about so important a matter. Adult education in matters pertaining to sex is important and can be handled through mothers' groups, parent-teacher associations, night classes, extension courses and the like. The school must seek only to supplement the home. It must avoid taking this subject away from the parents but rather it must merely bridge the present gap until the home is able to take up its normal and logical responsibility.

QUALIFICATIONS FOR TEACHING HEALTH

THOMAS A. STORY, M.D., PH.D.
Professor and General Director of Hygiene and Physical Education
STANFORD UNIVERSITY, CALIF.

The health of the individual as a whole is a combination of essential somatic, mental and social qualities of living. By somatic health I mean body health including normal growth, development, competence and comfort. By mental health I mean the service of a normal, adjusted, orderly, satisfied, happy, joyous, vigorous mind. Health is taught for two main purposes; to present information to the individual and for the formation and practice of wholesome healthy habits with particular reference to the age involved, the health of his family and the health of his community. Some of the critically important periods in the life of the individual where he should be taught health with a special emphasis include (1) when marriage is contemplated, (2) when parenthood is expected, (3) in early infancy, (4) in the preschool period, (5) during the elementary school period, (6) in the secondary school, (7) in college, (8) in professional school, (9) when the individual is not in the home or in school and (10) during adult life.

Those who teach health nowadays include: (*a*) friends, neighbors, the gang, the prospective mate, (*b*) the man in the street, (*c*) the movies, theater, radio, books, articles, newspapers, magazines, advertising matter, (*d*) the family, (*e*) cultists, faddists, quacks, (*f*) clergymen, (*g*) family doctors, (*h*) self-appointed advisers, (*i*) school instructors, (*j*) drug store clerks and others. In the various periods of life different influences come to bear, but at some time or other practically all of those mentioned influence the health conduct of the individual.

The qualifications for teaching health include a sound understanding of human biology, a knowledge of human anatomy and physiology, a knowledge of normal psychology and of social psychology, a knowledge of the agents that injure health and of defenses against them, a knowledge of the principles and practices of hygiene, a superior medical education or access to consultation with such a person and a knowledge of the technic of teaching.

Effective health teaching can arrive only when all our instructional influences integrate into a coordinate total health program, through the practice of individual hygiene, group hygiene and society hygiene. A knowledge of health does not produce health. Qualifications for teaching health are of the greatest importance for the teacher and for the individual being taught, but health comes not only from being taught and from the wisdom of understanding but from the favor of heritage and from the favor of environment and from the practice of behaviors that are favorable to health.

AUDIOMETERS AND THEIR PLACE IN THE SCHOOL PROGRAM

ISAAC H. JONES, M.D.
LOS ANGELES
AND
VERN O. KNUDSEN, PH.D.
LOS ANGELES

With money, and not an excessive amount, it would be a simple matter to have trained workers test the hearing of all school children, make a more careful examination of those who show a hearing defect and refer those who need treatment to their own physicians. If this were done hundreds of thousands of children would be saved from the handicap of becoming hard of hearing in later life. The universal experience of otolaryngologists has been that patients come to them too late. There is no approach to the prevention of deafness to compare with the systematic and universal exami-

nation of the hearing of school children. Last year in the state of California more than two million dollars was spent for the blind, one third furnished by the federal government, one third by the state of California and one third by the counties. Whether the money should come from this or other sources, the medical profession should bestir itself in this service but should make every effort to keep it free from unworthy political influence. Tests with the 4A audiometer by themselves do not meet the need but must be followed by individual audiometric tests and suitable treatment. Nine thousand students have been tested with audiometers annually in the Los Angeles public schools; there are two hundred thousand pupils in the first eight grades. With a larger staff it would be possible to test twenty-five thousand pupils annually with one 4A audiometer. About half of the children are found to have an impairment of hearing of such a degree that they will require a careful routine ear, nose and throat examination. This would require two otolaryngologists, two nurses, two clinical audiometers, one 4A audiometer, two full time technicians and one full time clerk. Individual tests, to be accurate, must be conducted in a very quiet room or soundproof booth. After the audiometric and ear, nose and throat examination, notices should be sent to the parents recommending that they consult the ear, nose and throat specialist of their choice.

GRADUATE MEDICAL EDUCATION: TENNESSEE

A PROGRESS REPORT OF THE FIELD STUDY ON GRADUATE MEDICAL EDUCATION IN THE UNITED STATES BEING CONDUCTED BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS

The Tennessee State Medical Association in 1936 formed a committee on medical education to study the educational needs of practicing physicians in the state. It was recommended by this committee that a postgraduate extension course in obstetrics be established, and the state association appropriated $1,500 toward financing such instruction. Vanderbilt University, the University of Tennessee and the Tennessee Department of Public Health made similar or smaller contributions, the Commonwealth Fund of New York contributing a larger amount. A standing committee on postgraduate instruction in obstetrics was formed with four physicians from the association and one from each of the three contributing agencies in the state, with Dr. James R. Reinberger as chairman. An organization was created to provide for instruction with three full time employees, office space being donated by the University of Tennessee at Memphis. A trained and experienced field clinician, a field organizer and an office secretary inaugurated the proposed postgraduate course.

Instruction proceeded on the circuit plan, the state being divided into nine geographic divisions, excluding certain metropolitan sections until the rural areas had been covered. About ten counties constitute a circuit, and a two hour period of instruction is given weekly for ten times in each of the circuit's five or six teaching centers. An hour of lecture is followed by projection of movies or lantern slides and informal discussion and finally an examination of patients brought in by the local clinic chairman. Where clinical material is not available, manikins are used. Patients are seen in consultation without fee, this being considered a service of the state association. Lectures to the public are included, and in the first circuit seven lay groups were addressed by the field clinician, usually on antepartum care. Talks are given on request at regular meetings of county societies on subjects not included in the course.

A registration fee of $5 was charged each physician. By March 1, 1938, 896 physicians of the 2,939 in the state had registered. There are 1,731 members of the state association. The average attendance has been approximately 87 per cent for the ten clinic periods. Certificates of attendance are being prepared for physicians who have attended seven or more of these meetings. An abstract of the lectures has been prepared by the field clinician and published by the committee to be supplied at the end of the course to all who have enrolled. More than half of the registrants have requested the postgraduate committee to furnish cards for making antepartum records. The first year's budget for the entire educational program was $16,500. The course was publicized by the field organizer, who visited in person rural physicians in the area where the course was to be organized. These visits were followed by letters and cards announcing the course, and notices appeared in the state association's journal and in local newspapers.

Answers to a questionnaire submitted to physicians participating in postgraduate instruction indicate that courses are desired similar to the one being concluded this year in obstetrics. Pediatrics, internal medicine, surgical diagnosis, traumatic and orthopedic surgery and anatomy were the subjects most frequently requested by 275 of the 750 physicians questioned. It is hoped that physicians and agencies within the state may finance such instruction and provide for a permanent educational organization. Postgraduate teaching, as now being conducted, is believed to be an excellent means of reorganizing and reactivating dormant county societies for the primary purpose of elevating the standards of practice of rural physicians. At the same time the public is being educated to appreciate the advantages of proper medical care.

The Commonwealth Fund each year since 1930 has provided fellowships for twenty physicians of Tennessee seeking further training in medical centers. This year eight of the twenty registrants at Vanderbilt University School of Medicine will come from Oklahoma. Each applicant is interviewed personally and when accepted is given a stipend and traveling expenses. His tuition of $150 and a small breakage fee are paid also. Four months of intramural instruction is given during the summer and is essentially the four year undergraduate course in miniature. Dr. John P. Youmans, director of postgraduate instruction, has divided the course into five periods. The first four weeks is devoted to clinical diagnosis and clinical laboratory methods and consists of essential practical work with patients, who are demonstrated in the outpatient clinics and hospital wards. Basic clinical sciences are reviewed also as they apply to the general practice of medicine. Four subsequent periods are devoted to a consideration of the broader aspects of medicine, surgery, pediatrics and obstetrics. There are from three to six members of the faculty teaching physicians in each division of medicine. Actual examination of patients, performance of laboratory procedures, ward rounds, conferences and informal lectures constitute the methods of instruction. Work in the specialties, including gynecology and preventive medicine and attendance at necropsies and clinical pathologic conferences, is afforded. Free use of the library is permitted. The emphasis is on learning by performance under close supervision. An appreciation by clinical instructors of the problems and limitations of general practice seems essential for the success of such an effort. Approximately 100 physicians have had the benefits of this training, although twice this number have applied.

The School of Medicine at Vanderbilt University also offers a three months postgraduate course in public health, for which the tuition is $100. This course is designed primarily for health officers. Seventeen men from seven states are now registered. Physicians desiring special training in syphilology may join the staff of the University Clinic for varying periods, depending on the individual needs for training. Intensive intramural courses in other special subjects are offered during the summer. Daily practical and clinical instruction over two to three weeks is available in pediatrics, gynecology, obstetrics, x-ray, allergy, cardiovascular-renal diseases, diseases of the blood, metabolic and endocrine diseases and other special courses in the various divisions of medicine. Tuition fees from $25 to $100 are charged, the yearly registration averaging not more than five physicians.

The library at the School of Medicine at Vanderbilt University has a record of the number of loans made by physicians

111
938

in Tennessee over the past seven years. There were 145 journals or books lent to sixty-five individuals during this period.

The Department of Medicine of Meharry Medical College is offering a two weeks intensive review course this year in which the enrolment will be limited to from fifteen to twenty colored physicians. Subjects selected include physical diagnosis, clinical laboratory methods, syphilis, tuberculosis, cardiovascular-renal disease, gastro-enterology, urology, infectious diseases, cancer, pediatrics and obstetrics-gynecology. Ward rounds, attendance at clinics and clinical pathologic conferences and symposiums are to be stressed. A tuition fee of $10 is to be charged.

The University of Tennessee College of Medicine offers graduate instruction in the department of orthopedic surgery leading to the degree of master of science in this subject. Five physicians have qualified for the course and are now engaged in a three year period of advanced study. Successful performance in preliminary and final oral, written and practical examinations and the preparation of an acceptable thesis are required. Similar courses in five other divisions of medicine are contemplated.

Of the several sectional medical societies in Tennessee, the Mid-South Postgraduate Medical Assembly is the oldest and best known. It was founded in 1883 as the Tri-State Medical Association and was reorganized in 1931 under its present name. It is the purpose of this group to provide instruction for physicians in the general vicinity of Memphis, where the four day meetings are always held. The present secretary-treasurer, Dr. A. F. Cooper, has organized and managed the assemblies during the sixteen year period he has held this office. This year's assembly was addressed exclusively by twenty-three out of state speakers. Many of the lectures were illustrated. There were round table discussions, symposiums and scientific exhibits. A $5 registration fee is charged each registrant. This constitutes the dues, which, with the income from commercial exhibits, finance the activities of the assembly. The clinical reports are submitted to the *Mississippi Doctor* for publication. There were 1,252 who registered for the last assembly, 661 being physicians, 233 of whom were from Memphis, 115 from other parts of Tennessee and 131 from Mississippi, ninety-eight from Arkansas, sixteen from Alabama, fourteen from Missouri and ten or less from such states as Kentucky, Texas, Louisiana, Oklahoma, Kansas and Illinois. There were approximately 400 medical students and a number of nurses who attended. Each year there is an increased interest in this postgraduate assembly. Any physician in good standing in a state medical society may attend.

The Tennessee Valley Post Graduate Medical Assembly is organized exclusively for postgraduate study. The three day course of lectures by guest speakers provides physicians in the vicinity of Knoxville with a series of lectures and discussions on recent advances in medicine. Fifteen out of state speakers contributed to last year's program. Dr. Jesse C. Hill has been secretary of the assembly since it was founded four years ago. A $4 registration fee is charged any physician affiliated with a state medical society who attends. Commercial exhibits aid in the financing. The attendance at these assemblies has averaged about 350, the physicians coming from Tennessee, Kentucky, Virginia, West Virginia, North Carolina and Georgia.

The Nashville Postgraduate Medical Association, of which Dr. Jefferson C. Pennington is secretary, was formed in 1934 to provide practicing physicians with an opportunity to examine, diagnose and treat patients in the wards and clinics of the Nashville General Hospital. The membership of the association has increased from fourteen to twenty-one, each member subscribing $10. A two weeks period of lectures, demonstrations, medical, surgical, pediatric, obstetric, gynecologic and other specialty clinics and ward rounds are held each year. The attendance has varied from fifteen to thirty under the supervision of approximately sixty-five teachers, including members of the association. The attending physicians are divided into three groups to allow greater opportunity for learning and to provide more personal instruction, which is spread over a twelve hour period daily five days each week. Physicians who desire to see obstetric or other emergency cases at night may do so, and deliveries may be conducted under supervision. Physicians are circularized in middle Tennessee, southern Kentucky and northern Alabama, each registrant paying a fee of $10.

The Middle Tennessee Medical Association, of which Dr. Daugh W. Smith is secretary-treasurer, was formed in 1887 to provide physicians in thirty-five counties of middle Tennessee with some annual postgraduate programs. Approximately 125 physicians attend yearly, each paying a $3 registration fee. The last meeting, which was held in Dickson, was devoted to two days of lectures and discussions given by Tennessee physicians on thirteen subjects.

Three other district medical organizations give one or two day semi-annual or annual programs of lectures and discussions. These are the East Tennessee Medical Association, the West Tennessee Medical Association and the Upper Cumberland Medical Association. Guest speakers are invited. Registration fees are $2, and the yearly attendance in each section is from 150 to 250 physicians.

The annual meeting of the Tennessee State Medical Association is devoted in part to graduate instruction. The approximate attendance each year is 700.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST; SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ARIZONA

Personal.—Dr. William M. Bevis, clinical director of Soldiers Home Hospital, Mountain Home, Tenn., has been appointed to a similar position at the Veterans' Administration Facility, Whipple.

ARKANSAS

District Meetings.—The Ninth Councilor District Medical Society was addressed in Harrison June 7 by Drs. Seldon W. Chambers, Harrison, on "Activities of the Full Time County Health Officer and His Relations with the Family Physician"; Davis W. Goldstein, Fort Smith, "Control of Syphilis"; Ross E. Fowler, Harrison, "Preoperative Treatment of Prostatic Obstruction," and Henry V. Kirby, Harrison, tularemia.—— At a meeting of the Fifth Councilor District Medical Society in Magnolia June 14 the speakers were Drs. George H. Robinson, Shreveport, "Conservative Treatment of the Ruptured Appendix"; Ralph Bowen, Oklahoma City, allergy, and Henry King Wade, Hot Springs National Park, diseases of the testicles.

CALIFORNIA

Changes in Health Officers.—Dr. Paul W. Schriber has been appointed health officer of Atwater, succeeding Dr. Clarence C. Fitzgibbon, Merced. Dr. Fitzgibbon is health officer of Merced County.——Dr. Burton L. Zinnamon, San Francisco, has been appointed health officer of Sonoma County, effective July 1; the unit was recently placed on a full time basis. Dr. Frank E. Sohler Jr. has succeeded Dr. Donovan C. Oakleaf as health officer of Cloverdale.——Dr. Francis J. Peter has been appointed health officer of Turlock, succeeding Dr. Charles E. Pearson.

Society News.—Dr. Leo Eloesser, recently returned after spending nine months with the government forces in Spain, will address a special meeting of the San Francisco County Medical Society August 23 on "War Surgery in Spain." Dr. Philip E. C. Manson-Bahr, London, England, will address a general meeting of the society August 30 on "Differential Diagnosis of Fever from a Practical Point of View."—— Dr. Harry Clare Shepardson, San Francisco, discussed "Clinical Experiences with Long-Acting Insulins" before the Hollywood Academy of Medicine July 14.

FLORIDA

Personal.—Dr. Lauren McCall Sompayrac, Jacksonville, was awarded the Robert L. Schirmer cup July 12 by the Junior Chamber of Commerce, in recognition of his "meritorious leadership" during the past six months. Dr. Sompayrac has been chairman of the health and sanitation committee, which is actively engaged in a campaign against venereal diseases; he is also president of the Duval County Social Hygiene Council.

Society News.—Dr. Julian Deryl Hart, Durham, N. C., discussed the use of ultraviolet rays in sterilizing the operating room before the Hillsborough County Medical Society June 7.

——Officers of the Florida Radiological Society elected at its recent annual meeting are Drs. Harold O. Brown, Tampa, president; Harry B. McEuen, Jacksonville, vice president, and Joseph H. Lucinian, Miami, secretary.——Dr. Arthur J. Bicker discussed "Cardiology in Aviation" before the Pinellas County Medical Society in St. Petersburg July 1.

District Meeting.—The Northeast Medical District Society will hold its second annual meeting in Ponte Vedra September 15 at the Old Club, under the presidency of Dr. Wilfred McL. Shaw, Jacksonville. Dr. James Lunsford Boone, Jacksonville, president, Duval County Medical Society, will give the address of welcome. In addition to speeches by some of the officers of the state medical society, addresses will be delivered by the following:

Dr. Charles E. Tribble, DeLand, Dystocia Due to Sacral Teratoma.
Dr. Allen P. Gurganious, Palatka, Common Sense Medicine.
Dr. Evan B. Wood, Daytona, Coronary Occlusion.
Dr. Vernon A. Lockwood, St. Augustine, Industrial Disability—Its Evaluation and Prevention.

GEORGIA

New Director of Cancer Division.—Dr. Ralph Mosteller, pathologist and director of the laboratory, Spartanburg General Hospital, Spartanburg, S. C., has been appointed director of the division of cancer control of the state department of health, Atlanta, it is reported. He succeeds Mr. J. W. Schereschewsky. Dr. Mosteller graduated at the University of Georgia School of Medicine, Augusta, in 1931.

IDAHO

State Medical Meeting at Sun Valley.—The Idaho State Medical Association will hold its annual meeting at the Challenger Inn, Sun Valley, September 6-10, under the presidency of Dr. Arthur C. Jones, Boise. The program is a graduate course of lectures in the morning and afternoon and round table conferences at luncheon. Members of the faculty of the University of Michigan Medical School, Ann Arbor, will be the lecturers this year:

Howard B. Lewis, Ph.D., Use and Abuse of the Methods of Blood Chemistry.
Dr. Cyrus C. Sturgis, Recent Advances in the Treatment of Blood Diseases.
Dr. Frederick A. Coller, Fluid and Electrolyte Balance in the Sick Patient.
Dr. Norman F. Miller, Obstetric Forceps—Their Use and Misuse.
Dr. Albert C. Furstenberg, The Clinical and Pathologic Study of Tumors and Cysts of the Head and Neck.

The speakers will deliver other lectures during the five day session.

ILLINOIS

Society News.—Dr. Lewis C. Scheffey, Philadelphia, addressed a meeting and conducted a clinic at the Sloan Clinic, Bloomington, June 22-23; his subject was "Changing Concepts in the Management of Cancer of the Body of the Uterus."——Dr. Joseph J. Link, Mattoon, discussed preoperative and postoperative care at a meeting of the Coles-Cumberland County Medical Society in Charleston July 13.——Dr. Carlo S. Scuderi, Chicago, addressed the Marion County Medical Society July 28 on "Modern Concept of Fractures of the Neck of the Femur."

Chicago

Dr. De Lee Honored.—The main building of the Chicago Lying-In Hospital group on the Midway will in the future be known as the Joseph B. De Lee Hospital in honor of its founder, in accordance with a recent change in contract merging the hospital with the University of Chicago. Since the merger with the university, the name of the hospital has become "The Chicago Lying-In Hospital of the University of Chicago." In addition to the main section of the building, named in honor of Dr. De Lee, there is the "Mothers' Aid Pavilion" for isolation cases and the "Max Epstein Clinic," the outpatient division. The university agreed in the contract to continue the operation of the Stock Yards Dispensary, 734 West Forty-Seventh Street, which was operated by the hospital, for five years and thereafter as long as it may be useful. The service to women is also to be continued. Property heretofore used for the work of the Chicago Maternity Center has been given to that organization by the hospital. Dr. De Lee founded the Chicago Lying-In Hospital in a tenement house in Maxwell Street in 1895. He is professor emeritus of obstetrics and gynecology at the university.

Annual Occupational Disease Symposium.—The department of industrial medicine of Northwestern University Medical School will conduct its second annual symposium on occupational disease at Thorne Hall on the Chicago campus September 26-27. The speakers will include:

Dr. Carl M. Peterson, Secretary, Council on Industrial Health, American Medical Association, Industrial Disease Education.
Philip Drinker, Ch.E., professor of industrial hygiene, Harvard School of Public Health, Boston, The Scope of the Occupational Disease Research Problem.
Dr. Lewis J. Pollock, professor of nervous and mental diseases at Northwestern, Traumatic Neurosis.
Mr. Arthur H. Young, industrial relations counselor, The Place of Medical Service in Industrial Relations.
Dr. John G. Cunningham, Toronto, Canada, Industrial Plant Surveys.
Dr. Stanley J. Seeger, Milwaukee, chairman, Council on Industrial Health, American Medical Association, Industrial Health and Safety and the Practicing Physician.
Dr. Edgar V. Allen, Rochester, Minn.
Dr. James G. Carr, secretary and professor of medicine at Northwestern.

Dr. Irving S. Cutter, dean of the medical school, will be toastmaster at the banquet at the Blackstone Hotel in the evening and Mr. O. E. Mount, American Steel Foundries, will speak on "Industrial Health—The Responsibility of Labor, Management and the Community."

INDIANA

Personal.—Dr. Fletcher C. Stewart, Fort Stanton, N. M., has been appointed medical officer in charge of the U. S. Marine Hospital, Evansville.——Dr. Wallace E. Childs, Madison, was appointed, July 1, director of district health unit number one, consisting of Gibson, Pike, Posey and Warrick counties.

LOUISIANA

Society News.—At the joint scientific and executive meeting of the Orleans Parish Medical Society, New Orleans, July 11 the speakers were Drs. Narcisse F. Thiberge on "Study of the Thrombocyte in Allergy" and Merrill C. Beck, "Cyclopropane—Advantages and Disadvantages."——A recent meeting of the Morehouse Parish Medical Society was addressed in Bastrop by Dr. Charles J. Raney, Bastrop, on undulant fever.

New Director of Venereal Disease Control.—Dr. Ford S. Williams, director of the St. Mary Parish Health Department, Franklin, has been appointed state director of venereal disease control by the state board of health. Dr. Williams graduated at the Louisiana State University Medical Center, New Orleans, in 1934. He will be succeeded as director of the parish unit by Dr. Paul S. Parrino.

MASSACHUSETTS

Personal.—Dr. Malcolm J. Farrell, Waltham, has been appointed assistant superintendent of the Walter E. Fernald State School, Waverley, succeeding Dr. Charles S. Woodall, who resigned to become superintendent of the Brandon State School, Brandon, Vt.

State Medical Election.—Dr. Channing Frothingham, Boston, was elected president of the Massachusetts Medical Society at its annual meeting in Boston June 1. Dr. Albert W. Stearns, Billerica, was chosen vice president and Dr. Alexander S. Begg, Boston, reelected secretary.

MICHIGAN

Outbreak of Dysentery—Six Deaths.—The deaths of six children were reported in an outbreak of dysentery in Owosso, according to the Chicago *Tribune* August 7. Eight patients were ill in the hospital. Preliminary investigation revealed the disease to be Shiga dysentery, it was stated, and the state department of health had set up a laboratory in the town to study the outbreak.

Changes in Health Officers.—Dr. Ragnar T. Westman, Bay City, has resigned as director of the health department of Bay County. Dr. James A. Dolce, Charlotte, has been appointed assistant director and county health officer of Allegan County, it is reported. Dr. Morley B. Beckett, who recently resigned as county health officer, will continue as director of the Allegan and Van Buren county units, it was stated. Dr. Clifton C. E. Merritt, Iron Mountain, has resigned as health officer of Dickinson County to succeed Dr. Westman in Bay County.

MINNESOTA

Personal.—Dr. Abel R. Ellingson, Detroit Lakes, has been elected coroner of Becker County.——A testimonial dinner was held in honor of Dr. and Mrs. Aaron E. Henslin, LeRoy, in recognition of the completion by the former of forty-three years in the practice of medicine.

Commonwealth Fund Aids Graduate Teaching.—The courses offered to practicing physicians during the past two years by the Post Graduate Medical Institute in connection with

111
938

the Center for Continuation Study, University of Minnesota, have proved so popular that the Commonwealth Fund of New York is subsidizing the further development of the program over the next five years. Dr. William A. O'Brien, associate professor of preventive medicine and public health at the medical school, has been relieved of other duties to become director of postgraduate medical education on a full time basis. The Center for Continuation Study was erected late in 1936 at a cost of $300,000. It is used jointly by the professional schools of the University of Minnesota for intensive resident graduate instruction and contains living rooms for seventy-eight graduate students, dining hall, lounge, library, chapel, classrooms, administrative offices and parking garage. Any physician who is a member of his local medical society may attend the courses.

MONTANA

Plague Infection.—Plague infection has been proved in pooled tissue from two ground squirrels, and in a pool of ninety-eight fleas from twenty-eight ground squirrels of the same species, all taken June 24 ten miles north of Wisdom on Plempton Creek, Beaverhead County.

NEBRASKA

Graduate Course in Omaha.—The state department of health and the maternal and child health committee of the Nebraska State Medical Association sponsored a graduate course in obstetrics, gynecology and pediatrics July 11-23, given by members of the faculties of Creighton University and the University of Nebraska schools of medicine, Omaha. Clinics and demonstrations were held at St. Joseph's and University hospitals as well as at the universities.

NEW YORK

School Physicians' Meeting.—Dr. Michael Levitan, Rome, was elected president of the New York State Association of School Physicians at the annual meeting in Saratoga Springs June 27; Dr. Louis A. Van Kleeck, Manhasset, vice president, and Dr. Clara Adele Brown, Oswego, secretary. Among the speakers at the meeting were Drs. Alfred W. Jacobsen, Buffalo, on "Endocrine Studies in School Children"; Ernest L. Stebbins, Albany, "Communicable Diseases and the School," and John E. Burke, Schenectady, "Attacking Mental Hygiene Problems in the School."

Personal.—Dr. Arnold Shamaskin has resigned as medical superintendent of the Montefiore Hospital Country Sanatorium, Bedford Hills, to become superintendent and medical director of the Jewish Consumptives Relief Society Sanatorium in Spivak, Colo., October 1. —— Dr. Benjamin White Seaman, Hempstead, was the first person to receive an annual award established recently by the Nassau *Daily Review-Star* for the "most valuable service to the whole community by a local resident." The award, a medallion and citation, was presented at a dinner June 27, attended by 450 citizens of Nassau County. Arthur T. Vanderbilt, Newark, N. J., president of the American Bar Association, was the principal speaker. Dr. Seaman was honored for his activities in connection with the establishment of the Meadowbrook Hospital, Hempstead, completed in 1937.

New York City

Personal.—Dr. Francis Peyton Rous of the Rockefeller Institute for Medical Research received the honorary degree of doctor of science from the University of Cambridge, England, June 10. Dr. James B. Murphy of the institute received the honorary degree of doctor of science from Oglethorpe University, Atlanta, recently.——Dr. J. Bentley Squier was decorated by Crown Prince Gustaf Adolf of Sweden during his recent stay in the United States; Dr. Squier was made a Commander of the Order of the North Star.——Dr. Anthony Bassler received the honorary degree of doctor of laws from Hahnemann Medical College of Philadelphia June 9.

Society News.—Dr. Nathaniel E. Selby addressed the Bronx County Medical Society June 15 on "Hypnotism—Its Scientific Basis and Medical Application."——The Society for the Aid of Crippled Children in Palestine has recently formed a medical unit in New York. Dr. Michael S. Burman is chairman; Dr. Samuel E. Sinberg, vice president, and Dr. H. Howard Green, secretary. Dr. Henry Keller is surgical director of the society.——The Medical Society of the County of Queens will be addressed September 27 by Drs. Foster Kennedy on "The Organic Background of Mind" and Elizabeth I. Adamson, "Mild Depressions Cared for by Family Doctor."

Proposed City Food and Drug Bill.—A bill requiring registration of proprietary foods and drugs has been introduced in the city council and will probably be brought up for action in September. The bill requires payment of an initial registration fee of $25 for every proprietary product with subsequent annual fees of $10. Manufacturers would have to provide a statement of formula, qualitative and quantitative, and a list of judgments or decrees against the product by courts or government agencies; drug manufacturers would have to state the therapeutic or cosmetic value of their products and standards would have to be adopted, according to *Advertising Age*. A protest has been lodged with Mayor La Guardia by the Toilet Goods Association.

NORTH DAKOTA

Personal.—Dr. Elizabeth C. Smith, formerly of the division of maternal and child health of the Pennsylvania state department of health, has joined the staff of the division of child hygiene of the North Dakota State Department of Health.

State Medical Election.—Dr. Harry A. Brandes, Bismarck, was chosen president-elect of the North Dakota State Medical Association at the recent annual meeting in Bismarck. Dr. William H. Long, Fargo, will be the president for the coming year. Vice presidents elected were Drs. Cyril J. Glaspel, Grafton, and Frederick W. Fergusson, Kulm. Dr. William W. Wood, Jamestown, was elected secretary, and Fargo was chosen as the place for the 1939 meeting.

OHIO

University News.—Two gifts totaling $19,000 were given to the University of Cincinnati College of Medicine, Cincinnati, for research. One of $14,000 was given by the John and Mary R. Markle Foundation, New York, for a two year period to aid Dr. Tom D. Spies, associate professor of medicine, in his work on pellagra. The Taylor Instrument Companies, Rochester, N. Y., contributed $5,000 for further investigations in the field of vascular problems.

PENNSYLVANIA

Society News.—Dr. Joseph H. Barach, Pittsburgh, addressed the Indiana County Medical Society, Indiana, June 9, on "Present Day Conceptions and Treatment of Diabetes." Dr. Barach addressed the Crawford County Medical Society, Titusville, June 22, on "Clinical Interpretation of Arterial Hypertension and Arterial Hypotension."

SOUTH CAROLINA

Personal.—Mr. James L. Rogers, business manager of the Spartanburg General Hospital, Spartanburg, has been named superintendent of the hospital, effective July 15, following the resignation of Dr. James Moss Beeler to accept a similar position at the Grady Hospital, Atlanta, Ga.——Drs. Josiah S. Matthews, Denmark, and George R. Wilkinson, Greenville, were recently reappointed to the state board of medical examiners for terms of four years.——Dr. James L. Mims, Chester, has been appointed health officer for Jasper County, succeeding Dr. John B. Wallace, Fountain Inn, who returned to private practice.——Dr. Richard K. Brown of the staff of the Georgia State Tuberculosis Sanatorium, Alto, Ga., has been appointed superintendent of the Greenville County Tuberculosis Hospital, Greenville. —— Dr. Thomas K. Fairey, Johnston, has been appointed health officer of Union County.——Dr. Richard M. Street, Laurens, recently resigned as health officer of Abbeville and Laurens counties.

Society News.—At a meeting of the Second District Medical Association at Aiken July 28 the speakers were Drs. Richard Torpin, Augusta, Ga., on "Ectopic Pregnancy, Diagnosis and Treatment"; Julian D. Hart, Durham, N. C., "Sterilization of Air in Operating Rooms," and Alfred F. Burnside, Columbia, "Varicosities of the Lower Extremities." Dr. Douglas Jennings, Bennettsville, president-elect of the South Carolina Medical Association, made an address.——The Lee County Medical Society was recently reorganized with the following officers: Drs. John B. Cousar, Bishopville, president; Robert O. McCutchen, Bishopville, vice president, and Donald E. Michie, Bishopville, secretary-treasurer. Speakers at the reorganization meeting were Drs. James R. Des Portes, Fort Mill, president of the South Carolina Medical Association; Edgar A. Hines, Seneca, secretary of the association, and Edward T. Kelley, Kingstree, councilor of the seventh district.——At a meeting of the Columbia Medical Society July 11 the speakers included Drs. Coyt Ham, Sol B. McLendon and Glenn B. Carrigan, Columbia, on treatment of dementia praecox with

insulin and metrazol.——Dr. Elija M. Hicks, Florence, read a "Review of the Pituitary and Ovarian Hormones" before the Florence County Medical Society recently.

UTAH

State Medical Meeting at Ogden.—The forty-fourth annual meeting of the Utah State Medical Association will be held in the new High School Building, Ogden, September 1-3, under the presidency of Dr. Menzies J. Macfarlane, Cedar City. Included on the program will be the following:

Dr. Owen H. Wangensteen, Minneapolis, Role of the Surgeon in the Treatment of Pyogenic Infections.
Dr. Alvin G. Foord, Pasadena, Calif., Pathology of Tumor Nodules in the Breast.
Dr. Roger Anderson, Seattle, Fractures of the Shaft of the Femur.
Dr. Harry H. Bowing, Rochester, Minn., Advancements Made in the Treatment of Carcinoma of the Rectum.
Dr. Edmund W. Butler, San Francisco, Acute Traumatic Injuries of the Chest.
Dr. Milton J. Rosenau, Chapel Hill, N. C., Pneumonia: Epidemiology, Treatment and Prevention.
Dr. Jacob Arnold Bargen, Rochester, Minn., Diverticulosis and Diverticulitis of the Large Intestine.
Dr. Irvine McQuarrie, Minneapolis, Pathogenesis and Treatment of Edema in Children.
Dr. Nathaniel G. Alcock, Iowa City, Treatment of Enlarged Prostate.
Dr. Arnold S. Jackson, Madison, Wis., Gallbladder Operations.
Dr. William J. Kerr, San Francisco, Angina Pectoris, New Concepts of Etiology and Treatment.
Dr. Howard C. Naffziger, San Francisco, Peripheral Nerve Injuries and Their Treatment.
Dr. Irvin Abell, Louisville, Ky., President of the American Medical Association, Correction of Retrodisplacements and Complete Prolapse of the Uterus.

Dr. Rosenau will address a public meeting Thursday evening on "Fads and Fancies in Preventive Medicine and Public Health" and the annual banquet Friday evening on "Serendipity."

VIRGINIA

Director of State Hospitals Appointed.—A central office for supervision of the state hospitals and the Colony for the Epileptic and Feebleminded has recently been established in Richmond with Dr. Hugh C. Henry, Petersburg, as director. Dr. Henry, a graduate of the Medical College of Virginia in 1896, has been superintendent of the Central State Hospital at Petersburg since 1924.

111
938

WASHINGTON

Courses in Obstetrics.—Dr. Everett D. Plass, professor of obstetrics and gynecology, State University of Iowa College of Medicine, Iowa City, recently gave a group of lectures on obstetrics in Yakima, Walla Walla, Spokane, Bellingham, Tacoma, Chehalis and Seattle. The short courses continued for three days each.

State Medical Meeting at Bellingham.—The Washington State Medical Association will hold its annual meeting at the Bellingham Hotel, Bellingham, August 29-31, under the presidency of Dr. J. Reid Morrison, Bellingham. The speakers will include:

Dr. Byron F. Francis, Seattle, Recent Advances in Our Knowledge of Pulmonary Emphysema.
Dr. Edwin E. Osgood, Portland, Principles Which Should Govern the Therapeutic Use of Sulfanilamide.
Dr. Don C. Sutton, Chicago, Prophylaxis of Age.
Dr. Edward C. Moore, Los Angeles, Surgical Analysis of Biliary Surgery with Technic for Cholecystectomy.
Dr. Frederick Lemere, Seattle, Treatment of Mild Depression, A Common Neuropsychiatric Disorder Frequently Seen by the General Practitioner.
Dr. David Metheny, Seattle, Nutritional Deficiencies Complicating Surgery of the Gastrointestinal Tract.
Dr. Ralph H. Loe, Seattle, Gastroscopy.

The Public Health League of Washington and the Washington State Medical Service Bureau will hold their annual meetings during the session. The woman's auxiliary to the state society will also meet.

WISCONSIN

Society News.—Drs. Paul Padget, Baltimore, and Harold W. Shutter, Milwaukee, addressed the Columbia-Marquette-Adams County Medical Society, Wisconsin Dells, recently on "Care and Treatment of Syphilis" and "Toxemias of Pregnancy" respectively.——Dr. William T. Lindsay, Madison, addressed the Dodge County Medical Society, Beaver Dam, recently, on the disease of the pancreas.——At a meeting of the Kenosha County Medical Society in Kenosha in May Dr. George F. O'Brien, Chicago, spoke on coronary diseases.——Dr. James A. Evans, La Crosse, discussed "Lesions of the Gastro-Intestinal Tract" before the Monroe County Medical Society, Sparta, recently.——At a meeting of the Pierce-St. Croix County Medical Society, Ellsworth, recently, Dr. Willis H. Thompson, Minneapolis, presented papers on "The Use of Sulfanilamide in the Treatment of Diseases of Children" and "The Immunization of Children Against Whooping Cough, Diphtheria and Smallpox."——Drs. George W. Stuppy and Willard L. Wood, Chicago, addressed the Rock County Medical Society, Janesville, June 28, on "The Application of Allergy to Internal Medicine."——Dr. Cornelius H. Cremer, Cashton, was recently elected president of the state board of medical examiners.

PHILIPPINE ISLANDS

First Preventorium Opened.—The Quezon Preventorium of the White Cross, first tuberculosis preventorium in the Philippines, was opened in April in San Juan. Dr. Isidro Pertierra is director of the new institution, which has a capacity of 300 beds.

GENERAL

Examinations in Internal Medicine.—Written examinations for certification by the American Board of Internal Medicine will be held in various parts of the United States Monday October 17 and Monday Feb. 20, 1939. Formal application must be received by the secretary, Dr. William S. Middleton, 1301 University Avenue, Madison, Wis., before September 15 for the October examination and before January 1 for the February 1939 examination.

American Social Hygiene Association.—The American Society for the Control of Venereal Diseases, Inc., organized in California in 1937, has merged with the American Social Hygiene Association and will function as the Western division of the association, with headquarters at 45 Second Street, San Francisco. The Western division will be under the direction of a Western advisory committee including Drs. Ray Lyman Wilbur, Russell V. Lee, Stanford University, Calif.; Thomas A. Storey, William P. Shepard and Mr. Ray W. Smith, San Francisco.

Study of Tuberculosis in Newfoundland.—The International Grenfell Association is conducting a survey of the incidence of tuberculosis in northern Newfoundland. The survey was begun July 1 under the direction of Drs. Charles S. Curtis, medical superintendent of the Grenfell Hospitals in Newfoundland and Labrador, and Theodore L. Badger, Boston, president of the New England Grenfell Association, with the assistance of Dr. Roy M. Seideman, New York. They plan to make a tuberculin study in all age groups with x-ray examinations and studies of family contacts.

New Journal of Neurology.—*Confinia Neurologica* is a new journal to be published every two months with the object of "maintaining the mutual relationship of neurology and surgery, oto-ophthalmology, syphilology, endocrinology and radiology." Original articles, reviews, society transactions and book reviews are to be published. The articles may appear in English, French or German; original papers will have summaries in all three languages. Manuscripts, books for review and other communications should be sent to the editor, Dr. Ernest A. Spiegel, professor of experimental and applied neurology, Temple University, Broad Street at Ontario, Philadelphia.

Reunion of Veteran Medical Corps.—The medical corps of the various branches of government service are planning a reunion in Los Angeles, September 19-22, in conjunction with the national American Legion convention. Dr. Charles W. Decker has been appointed chairman of the medical corps reunion committee, which has established headquarters at the Ambassador Hotel, 3400 Wilshire Boulevard, Los Angeles. Members of the army, navy, air service and the marine and dental corps are invited to take part in the reunion, which marks the twentieth anniversary of the end of the World War. A luncheon at the Cocoanut Grove of the Ambassador Wednesday, September 21, will be one feature of the reunion.

Rural Health Awards.—Winners in the recent rural health conservation contest conducted by the U. S. Chamber of Commerce in cooperation with the American Public Health Association were as follows:

Northeastern division: Columbia County, N. Y.
Eastern division: Fayette County, Ky.
Southeastern division: Pike County, Miss.
North central division: Woodbury County, Iowa.
South central division: Amarillo and Potter County, Texas.
Western division: Clallam County, Wash.

Special awards were presented to Davidson County, Tenn.; El Paso, Texas, and Shawnee County, Kan., for having won the rural health contest twice and for having maintained their previous high standards of achievement during 1937. The rural health contest was financed by the W. K. Kellogg Foundation of Battle Creek, Mich.

Dr. Heiser to Direct Study of Healthful Working Conditions.—The National Association of Manufacturers has organized a committee on healthful working conditions and has appointed Dr. Victor G. Heiser, New York, internationally known hygienist for many years with the Rockefeller Foundation, as research director. A survey of plant conditions will be undertaken immediately and an information service will be established for approximately 80,000 factories employing from twenty-five to 2,000 workers. The committee was created recently with a view to assisting American industry in the field of industrial health and with the hope of bringing about a wider extension of medical service for workers. Dr. Donald M. Shafer, formerly of St. George, Staten Island, N. Y., was appointed assistant to Dr. Heiser. Headquarters of the committee are at 14 West Forty-Ninth Street, New York.

Aero Medical Association.—The tenth annual meeting of the Aero Medical Association of the United States will be held at Dayton, Ohio, September 2-4, with headquarters at the Biltmore Hotel. Some sessions will be held at Patterson and Wright fields. According to the tentative program, the following will speak, among others:

Capt. Charles L. Leedham, medical corps, U. S. Army, director, department of aviation medicine, School of Aviation Medicine, Randolph Field, The Place of the Electrocardiograph in the Examination for Flying—A Discussion of the Use of the Electrocardiograph in the Flying Examinations. Its Possibilities and Limitations.

Capt. Harry G. Armstrong, medical corps, U. S. Army, and John W. Heim, Ph.D., Boston, physiologic research laboratory, Wright Field, Effect of Acceleration on the Living Organisms.

Dr. Ralph N. Greene, Coral Gables, Fla., medical director, Eastern Airlines, Air Transport Flying from the Medical Standpoint.

Dr. Eldridge S. Adams, Washington, D. C., chief, medical section, bureau of air commerce, U. S. Department of Commerce, Problems Pertaining to the Department.

Society of American Bacteriologists.—The fortieth annual meeting of the Society of American Bacteriologists will be held at the Hotel Fairmont, San Francisco, August 30-September 1. Sections have been designated immunity, nitrogen fixation, pathogenic organisms, milk, water, food, methods, germicides, filtrable viruses, yeasts, fermentations and soil. A joint meeting of all sections Wednesday will be devoted to a consideration of enzymes in relation to bacteriology. Speakers will include:

Dr. Monroe D. Eaton Jr., New York, The Soluble Malarial Antigen in the Serum of Monkeys Infected with Plasmodium Knowlesi.

Dr. Stuart Mudd, Philadelphia, Certain Newer Aspects of the Antigenic Composition of Hemolytic Streptococci.

Dr. George E. Rockwell, Cincinnati, An Experimental Study of the Treatment of Pneumococcic Toxemia with a Special Carbon Preparation.

René J. Dubos, Ph.D., New York, Immunization of Experimental Animals with a Soluble Antigen Extracted from Avirulent Pneumococci.

Benjamin S. Levine, Ph.D., Washington, D. C., Experimental Staphylococcemia in White Mice Produced by the Intraperitoneal Injection of Toxin-Suspended Staphylococci.

Police Seek Wounded Man.—Physicians are asked to watch for a man named Huron Ted Walters, who may attempt to secure surgical treatment for a gunshot wound about eight inches above the knee. The wounded man is known to be traveling with one Floyd Garland Hamilton, although, in the one instance in which the Federal Bureau of Investigation was told that a doctor was visited, Walters entered the office alone. The men are reported to be in Illinois. Walters is 25 years of age. His description reads: height, 5 feet 8 inches; weight, about 145 pounds; eyes, gray-brown; hair, chestnut; complexion, medium dark; build, medium; race, white; nationality, American; education, grammar school. Hamilton is 30 years of age. His identification is as follows: height, 5 feet 10 inches; weight, 155; eyes, blue; hair, light brown; complexion, medium, sallow; build, slender; race, white; nationality, American. Both men are said to have had grade school education. Physicians visited by either of these men are asked to notify D. M. Ladd, special agent in charge, at Randolph 6226, or room 1900, 105 West Adams Street, Chicago.

FOREIGN

Personal.—Dr. James D. Boyd, lecturer in anatomy, University of Cambridge, has been appointed to the chair of anatomy at London Hospital Medical College, according to *Science*.

Society News.—The Association for Photographic and Cinematographic Documentation in the Sciences will hold its annual meeting in Paris October 6-7. All material sent from abroad must be addressed the Musée Pédagogique de l'Etat, 29 rue d'Ulm, Paris (5), Congrès de Documentation Photographique et Cinematographique. The closing date is October 1.

Congress of Comparative Pathology.—The fourth International Congress of Comparative Pathology will be held in Rome May 15-20, 1939, under the presidency of Prof. Pietro Rondoni, director of the cancer institute and of the Institute of General Pathology of the Royal University of Milan. The secretary is Prof. Vittorio Zavagli, director of the experimental station for animals, Rome, and the general secretary is Dr. Ugo Frascherelli, secretary of the National Research Council, Piazzale delle Scienze, Rome. Meetings will be held at the Royal University of Rome and the Institute for Public Health. There will be three sections: human medicine, veterinary medicine and phytopathology. Subjects to be discussed include ultravirus diseases, heredity in pathology, function of the associated antigens and regressive processes in plants.

CORRECTION

Infantile Cerebral Palsy.—Dr. Clarence H. Heyman writes that the sentence in the summary of his article in THE JOURNAL, August 6, page 493, which reads "Asymmetrical lesions indicate some factor operating before birth," should read "Asymmetrical lesions indicate a likely traumatic origin during birth, while the symmetrical lesions indicate some factor operating before birth."

Government Services

Physician to Advise on Food, Drug and Cosmetic Advertising

Dr. Knox E. Miller, surgeon, U. S. Public Health Service, has been assigned to act as technical consultant to the Federal Trade Commission, passing on medical and other claims made in advertising of food, drug and cosmetic products under the Wheeler-Lea act. Dr. Miller will arrange for such other assistance as may be necessary, "particularly in the line of laboratory examinations." Cooperation with existing federal laboratories is to be continued.

Examination for Assistant Physician at St. Elizabeths

The U. S. Civil Service Commission announces an open competitive examination for first assistant physician (psychiatrist) to act as assistant superintendent of St. Elizabeths Hospital, Washington, D. C. Applications must be on file with the commission by September 6. If received from the following states, they may be received by September 9: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming. The salary is $6,500 a year, with a deduction of 3.5 per cent toward a retirement annuity and a further deduction of $300 for quarters and subsistence. The duties of the position are "to act as assistant superintendent of the hospital; to exercise general supervision over the medical, scientific and allied professional activities and carry into effect the policies of the superintendent in the care and treatment of patients; and upon authority of the superintendent to plan and initiate, supervise, evaluate and be responsible for the administrative proceedings of the hospital, professional care of the patients and research problems. Competitors will not be required to report for examination at any place but will be rated on the extent of their education and experience. Applicants must have been graduated from a recognized medical school, except that the standing of the medical school may be waived in the case of graduates otherwise qualified who have had one year of satisfactory service in the commissioned medical corps of the Army, Navy or U. S. Public Health Service. They must have had at least ten years of experience in the care of patients with mental disease, five of which must have been in a senior administrative capacity. At least five years of experience must have been acquired within the ten year period immediately preceding the closing date for receipt of applications. Applicants must not have passed their fifty-third birthday, except in the case of persons granted preference because of military or naval service. Further details are given in the application form, which may be obtained from the secretary, board of civil service examiners at any first class postoffice, from the commission at Washington, D. C., or from the district offices of the commission at any of the following cities: Atlanta, Boston, Chicago, Cincinnati, Denver, New Orleans, New York, Philadelphia, Seattle, St. Louis, St. Paul, San Francisco, Honolulu, Balboa Heights, Canal Zone, and San Juan, P. R.

Foreign Letters

LONDON

(From Our Regular Correspondent)

July 27, 1938.

The Induction of Abortion in a Case of Rape

To the great satisfaction of the medical profession, Mr. Aleck Bourne, who was prosecuted for curetting a girl aged 14, who had become pregnant after rape, has been acquitted. The attorney general, who prosecuted, admitted that if the operation was done to save the mother's life it would not be unlawful, but he contended that the law meant immediate danger to life, not danger to health. In his evidence Mr. Bourne stated that in 1935 he did a similar operation on a girl of 15 and his house surgeon declined to assist him on religious grounds. This refusal led Mr. Bourne to decide that on the next occasion he would obtain the ruling of the court. If there were adequate medical reasons in the widest sense, on his interpretation of the law, based on the everyday practice of reputable members of the profession, he considered it justifiable to terminate pregnancy, and he could not draw a line between danger to life and danger to health. If a doctor waited for danger to life, the woman was past assistance. He emphatically included the preservation of mental health and the health of the nervous system among his indications. He did not think that the physical injuries in the present case would have caused difficulty of delivery, but the circumstances were such as to implant seeds of terror in the girl's mind. Fear and terror were the most serious deterrents to the unfolding of the whole process, so that assistance might be needed. The fact that the girl was a virgin who had been raped was a strong element in making up his mind. Her age was another; the chief bones of the pelvis were not united. Dr. J. R. Rees, medical psychologist, and Mr. William Gilliatt, obstetric surgeon, gave evidence in support of Mr. Bourne's view. Lord Horder said that he was not infrequently consulted in cases in which a severe mental or nervous breakdown seemed likely to occur if pregnancy was not terminated. The operation was justifiable in such cases. The facts of the child's age and the rape would have led him to the same conclusion.

The attorney general suggested that there was a fundamental difference between preserving life and preserving health. He also argued that the operation had not been done only for the purpose of preserving life. Mr. Bourne had never contended that the operation was necessary to preserve the immediate life of the girl. The judge said that as far as he knew a case of this type had never come before a jury in such circumstances. Even among counsel there seemed to have been some doubt about the expression of the law. The case was of great importance to the medical profession. It had nothing to do with the ordinary case of procuring abortion. The judge could not agree with the attorney general that there was a clear dividing line between danger to life and danger to health. Impairment of health might reach a stage where it was a danger to life. If the jury could not say that there was this division into two separate classes, they might, as put forward by the defense, consider the words "for the purpose of preserving the life of the mother" in a wide and liberal sense. In the medical profession there was a great divergence of view. Some persons held that the desire of the woman for the operation was sufficient justification. That was not the law. On the other hand, some objected on religious grounds to the operation's being performed under any circumstances. That was not the law either. "If pregnancy is likely to make a woman a physical and mental wreck," a doctor who operated in that belief did so "for the purpose of preserving the life of the mother." The jury returned a verdict of "not guilty."

So far the case clears up one uncertainty of the law, but it gives no support to the view that abortion should be legal in a case of rape. The law of abortion is not in a satisfactory state and is under consideration by a committee appointed by the government. In a letter published in the medical journals Lord Horder, Havelock Ellis, Julian Huxley, Langdon-Brown, Prof. J. A. Ryle and other members of the Eugenic Society state that many arguments may be advanced for widening the grounds on which abortion should be permitted, but they deal only with the eugenic one. They think it should be permissible in cases of mental deficiency when the subjects are appropriate candidates for sterilization. This is the law in Denmark, where also incestuous union and rape are sufficient grounds.

Overseas Settlement and Population Trends

In the House of Lords an important debate took place on the recent report of the Oversea Settlement Board. The problem is difficult, as, on the one hand, in the present dangerous international situation it is more desirable than ever that the sparsely populated dominions and colonies should be peopled and, on the other hand, the prevalent unemployment makes the dominions unwilling to encourage immigration. The duke of Devonshire, undersecretary for dominion affairs, said that the white population of the empire was about 70,000,000, of which no less than 49,000,000 were congregated in the British Isles. Throughout the last century and up to the great war that white population was expanding rapidly and distributing itself over the empire. But for a variety of reasons the rate of expansion had been slowing down, and if the present tendency was continued the population would before many years become stationary and then rapidly diminish. The fall of emigration was great. In 1913 285,000 British left this country for the dominions and 61,000 returned, a net outward movement of 224,000. In 1937 the outward movement was only 26,000 and 34,000 returned, a net inward movement of 8,000. This was a very serious state of affairs.

Members of the Oversea Settlement Board were brought up against the question of population trends and took expert advice. They were told that to maintain a population a birth rate of about 19½ per thousand was necessary. In 1876 the birth rate of the United Kingdom was 36 but now was a shade over 15 and therefore below the replacement rate. There had been a similar drop in the dominions. In 1911 the birth rate in Australia and New Zealand was 27; today it had fallen to 17.1 in Australia and to 16.6 in New Zealand, in both cases below the replacement rate. In Canada the rate was 20, barely over replacement. But that was not entirely satisfactory, as the large birth rate was confined to one section, while the rest of the dominion had a very low rate. Only South Africa, with a rate of 24, promised to expand.

Osteopath Sent to Jail

A school teacher aged 23, who had suffered from diabetes since the age of 19, was under insulin treatment by a physician when a friend advised her to see an osteopath, who used a stethoscope, pulled down her eyelids and told her mother that she had never suffered from diabetes (THE JOURNAL, June 25). She was, he said, suffering from anemia, which might become pernicious. He ordered her to starve herself and take orange juice. The girl was so overjoyed that she ran out to her father, who was waiting in a car, and said "I have good news. I have not got diabetes and never had." Later her father telephoned to the osteopath that she had lost weight and disliked orange juice. The reply was "Splendid; tell her to grit her teeth and continue the treatment until she sees me

on Thursday." By that day she had passed into coma. She died a week later in a hospital. At his trial for manslaughter the osteopath said that he found no external symptoms of diabetes and meant to carry out tests on the next occasion. In cross examination he admitted that he had no experience of diabetes. The judge asked why he did not say this when asked whether the girl had diabetes. He made no reply. He was found guilty and sentenced to six months' imprisonment.

Septic Infection at Necropsies

The Pathological Society of Great Britain has issued a pamphlet of valuable advice on the prevention of septic infection in the performance of necropsies. Proper care should be taken of postmortem gloves. When there are recent cuts or scratches on the hands it is inadvisable to perform necropsies. If during a necropsy the pathologist should prick himself however slightly, whether with a knife or on a jagged bone or tooth, even if he is in doubt whether he has been pricked at all he should stop at once, remove his glove and make the wound bleed by digital compression causing congestion, by swinging the arm, by sucking and by putting the hand in hot water. There should not be a minute's delay in carrying out these procedures, and, if possible, the necropsy should be completed by some one else.

PARIS

(From Our Regular Correspondent)

July 23, 1938.

Director of Pasteur Institute Honored in United States

During the recent visit of Dr. Louis Martin of Paris to the United States the degree of doctor of laws was conferred on him by both the University of Pennsylvania and the University of Montreal as a recognition of the many important contributions which he has made in the field of bacteriology. He was elected director of the Pasteur Institute of Paris after the death of Prof. Emile Roux.

Lister Medal Awarded to Prof. René Leriche

A jury including representatives of the Royal College of Surgeons of England and also that of Ireland, as well as of the faculties of the Universities of Edinburgh and of Glasgow, has awarded the Lister medal to Prof. René Lériche. This medal is considered a great honor and was awarded as a recognition of the work of Professor Lériche in experimental and clinical surgery.

A Peculiar Type of Echinococcus of the Liver

Reference has been made in a previous letter to the occurrence in eastern France of a form of echinococcus disease of the liver which is not only difficult to diagnose before operation but resembles so little the usual gross appearance of echinococcus disease of the liver as to be unrecognizable as such at operation. A recent case, reported by Drs. Gricouroff and Agron at the June 15 meeting of the Académie de chirurgie of Paris, occurred in a section of France which is relatively far removed from the area in which the earlier cases were found. A woman aged 35, the wife of a farmer, had never been ill until January 1937, when she complained of fatigue, anorexia and occasional pain in the right side of the abdomen, all of six months' duration. Nothing objective was found at this time, but in October of the same year marked icterus and acholia of the stools were noted, which had been present for about six weeks. The liver was found to be greatly enlarged but there was no splenomegaly. X-ray examination for biliary calculi was negative, as was the Wassermann test. A preoperative diagnosis of calculous obstruction of the common duct was made. At operation, examination of the gallbladder, extrahepatic biliary ducts and pancreas failed to reveal anything abnormal. On the anterior surface of the right lobe of the greatly enlarged liver, three nodules were noted, the largest being the size of a half-dollar (30 mm.). After incision of this nodule, a grayish green liquid escaped and a drain was inserted, from which a large amount of bile and blood escaped. The patient died about seven days after the operation. Histologic study of the hepatic tissue removed at operation revealed the typical picture of an alveolar type of echinococcus disease. Of eighteen cases of this unusual form thus far observed in France, thirteen involved patients who lived close to the Swiss frontier.

The question in such cases is whether Taenia echinococcus, which gives rise to the classic cyst formation, differs from the tenia which causes the alveolar type of change in such viscera as the liver. Prof. F. Dève of Rouen, who has studied the disease, expressed the opinion that the alveolar form also is due to Taenia echinococcus. In central European countries over 400 cases and in Russia about 209 cases of the alveolar type have been observed. Clinically the picture may resemble cirrhosis of the liver of the Hanot type, an abscess or cancer of the liver or, as in the case reported, obstruction of the common duct. Most frequently the diagnosis of the alveolar type of echinococcus disease is made only after histologic study of the liver tissue. On gross examination the disease is characterized by the presence of a large number of contiguous minute cavities, each showing a more or less dry vesicular lining. In some reported cases it was possible to detect pulmonary metastases on x-ray examination.

The alveolar type has resisted all therapeutic measures, including operation.

BERLIN

(From Our Regular Correspondent)

June 27, 1938.

The German Society of Pharmacology

The German Society of Pharmacology met at the end of April in Berlin. Flury of Würzburg, the chairman, made the inaugural address, in which he outlined the scope of pharmacology. This field, he said, is concerned with all that lives, man, animals and plants, and also with all chemical substances as they relate to life. Pharmacology represents a wider aspect of physiology, in which unusual chemical influences, conditions and functions, together with their effects, are the material of study. Two principal provinces of pharmacology may be differentiated: pharmaceutics and toxicology. The author emphasized that to be properly equipped as a specialist and teacher of pharmacology the student must undergo a long period of training.

The chief topic for discussion on the first day was local anesthesia. It was stated that besides the importance of the chemical composition the function must also be considered. A sharp distinction must be drawn between surface anesthesia and local anesthesia. Procaine hydrochloride, for example, because of its solubility in water, is unable to adhere to the surface membranes. As Fromherz pointed out, the central nervous system is ten times more reactive to local anesthetics than the peripheral nerves. All attempts at evaluation of the extent of the therapeutic effect of these substances have failed; in each case the clinician has the last word. An important consideration is the detoxicant property of the utilized substance. In resorption, diffusion apparently plays a less important part than the movement through the lymphatics. Kirschner of Heidelberg, a surgeon, gave the clinical lecture. He set forth the advantages of high pressure and local lumbar anesthesia as utilized by him. As contraindications of local anesthesia

he mentioned exophthalmic goiter (on account of the heightened sensitivity to epinephrine), toxic heart disease, nutritional disorders, tissue necroses and circulatory disorders (arteriosclerosis, hypertension and so on). The mortality of lumbar anesthesia amounts to about 1:3,300. The procedure is unsuccessful in about 9 per cent of the cases. Certain renal manifestations may appear, as well as paralysis of the muscles of the eyes, paralysis of the lower half of the body and meningism. On the other hand, Kirschner stated, the fact remains that no other type of anesthesia produces a similar relaxation of the abdominal walls.

The chief theme on the second day was the etiology of cancer. Butenandt discussed the cancerigenic carbohydrates from the chemical standpoint. These substances are of particular interest since their most effective representative, methylcholanthrene, shows itself to be related to that important group of substances known as the sterols (included in which are bilic acid, glandular preparations, corticosterone, vitamin D, digitalis glycosides, saponin and toad's venom). The author uttered a warning against the ill considered statement that estrogen is a cancerigenic substance. Gye of London delivered a lecture on the differentiation of external cancerigenic factors, or remote causes, and proximate, or intimate causes. According to his opinion, virus plays an important part as an intimate cancerigenic factor. The pharmacologic effects of benzopyrine were then thoroughly discussed. Professor Roessle, Berlin pathologic anatomist, then upheld, in opposition to Gye, the hypothesis of a diversified causation of cancer, which excludes the presence of virus as a universal "intimate cause."

On the third day the problem of coffee came in for thorough discussion. After a comprehensive general introduction by Straub of Munich, Eichler of Breslau submitted a detailed pharmacologic report. He pointed out that chronaxia of muscles is more plainly reduced than chronaxia of nerves. The completely developed fatigue is more quickly abolished by caffeine. Since the substance tends to increase the myocardial tonus, it is more fit for the overcoming of high resistance than for performance of greater volume-work. For the increase in secretion of gastric juice stimulated by caffeine, it is precisely the roasted products which are of importance. The rate of gastric evacuation remains unchanged. Some manifestations of diarrhea are perhaps ascribable to the presence of choline. In human milk 1 per cent of the administered caffeine remains undecomposed. The basal metabolic rate increases by from 6.5 to 23 per cent. Eichler has been unable to verify the damage to the germ cells following administration of caffeine in massive doses observed by Stieve, Berlin anatomist. Stepp of Munich read the clinical lecture. He recommends the use of caffeine in the treatment of cardiac disorders when the previous degree of digitalization is not known, as well as in the treatment of bradycardic types of insufficiency. Caffeine also acts favorably in cases of collapse from uncertain causes of asthenic persons with hypotonic manifestations. Patients with gastro-enterocolitis are unable to tolerate caffeine. In cases of gout and diabetes small amounts of caffeine are innocuous.

The president of the society provided an explanatory talk in which he emphasized that the coffee problem is not exclusively a caffeine problem. The chemical interrelation and the combined effect of caffeine and other ingredients of the coffee bean offer many unsolved problems. To what extent caffeine as a supplementary food is beneficial or deleterious to general health is, according to the present state of our knowledge, primarily a question of the amount of caffeine ingested. Additional factors of importance are the source of the coffee and the type of the roasting and other preparative processes. Clinical data have shown that the ordinary use of coffee is unaccompanied by any harmful effects, either temporary or permanent.

AUSTRALIA

(From Our Regular Correspondent)

July 5, 1938.

National Health Insurance

The bill for national health and pensions insurance has now been passed by both houses of the commonwealth parliament. The scheme will come into operation in January 1939, and plans for its organization are already in progress. A royal commission is to be appointed to investigate fully the question of capitation fees payable to practitioners working under the scheme, and the British Medical Association in Australia is collecting statistical evidence to present to the commission in support of its claims for a higher capitation fee than that originally proposed by the government. Every member has been asked to supply any information he can which is relevant to the investigation, with particular reference to income as derived from lodge and private practice. The association intends raising an emergency fund of £20,000 to cover expenses such as statistician's fees and traveling expenses of members giving evidence. Each member of the association is expected to contribute £10 to this fund.

An adequate capitation fee is of vital importance to the profession in Australia, as over 80 per cent of the population are brought under the scheme. Five per cent of the remainder are unemployed, so that only 15 per cent of the people will receive medical treatment as private patients. It was pointed out in the first progress report of the national insurance commission in 1926 that 800 friendly society contracts were a burden for any one man working in a metropolitan district. This figure represents about 2,000 persons. It is estimated that about 10,000 visits a year would be required of such a practice, using the English panel experience of five visits a year per patient. The gross income under the national insurance scheme derived from 2,000 insured people would be £1,100. Estimating the minimum overhead expense in running a general practice at £500, this leaves a net income of £600 a year. Under the insurance scheme the average number of contracts per practitioner will be approximately 600, representing 1,500 people, 7,500 visits and a net income of £375 a year. Allowing for fees paid for extra services and the small amount of private practice, it would be difficult for any practitioner to receive a net income exceeding £600 per annum. Furthermore, with an income of £600, after a long and expensive training and after purchasing a private practice, no time and little money would be available for graduate study, and it would be difficult to maintain an efficient service for the community under such terms.

Calculation of the per capita payment was made by the government as follows: The average contract fee paid by friendly societies was taken as 29 shillings. The average number of persons covered by one contract fee was taken as 3.2. For extra service required under the insurance as against friendly society service, a ratio of 2 shillings in 9 shillings was agreed to. Twenty-nine shillings divided by 3.2 gave 9 shillings, which, together with 2 shillings for extra service, made 11 shillings the capitation fee. The assumption that the rates of payment for friendly societies contract practice were fair and adequate, especially when entirely changed conditions were to be dealt with, is itself questionable. Apart from this, a reliable calculation from census figures indicates that the family unit of 3.2 is too high an estimation and that a figure of not more than 2.5 should have been taken. The effect of this figure

is to change the per capita payment of 11 shillings to 15s. 3d. Moreover, insurance practice will be operating under much altered conditions. At present the inadequacy of friendly society practice is offset to some extent by income derived from private practice. Under the insurance scheme the ratio of contract to private practice will be greatly increased. The royal commission is to be appointed by the government and for this reason is considered by the British Medical Association to be in reality a court of inquiry appointed by one of the parties. Although members are prepared to present evidence to the commission, it is officially stated that they will not accept its findings unless an efficient medical service for the public and satisfactory conditions for practitioners are provided.

Queensland's Medical Problems

Plans for the complete reorganization of the hospital system in Queensland have been launched. They include the elimination of the honorary system of medical attendance and in many respects may indicate a complete change in the relationship between the state, the medical profession and the public. This move was intimated some months ago in an open letter to the profession signed by Sir Raphael Cilento, director general of health and medical services and honorary professor of social and tropical medicine in the University of Queensland. It was pointed out that the honorary system had been rendered an anachronism by the fact that complete medical service was beyond the means of 80 per cent of the people unless they were members of some contributory scheme and that the greater burdens laid on the middle class made the maintenance of health—that is, preventive medicine—and the restoration of health as a community measure—that is, cheap hospitalization—the main aspects of medical practice of the immediate future. It was implied that only by making medical service a government function could the position be satisfactorily dealt with. It was pointed out also that the health service of the future will inevitably conform to the governmental framework. There will be no interference with medicine as a science. What the public demands is the right to say not how medicine shall be practiced but how it shall be purchased and paid for.

For some years the state government has been seriously bent on a hospitalization program. The commonwealth government has now superimposed a scheme for national health insurance. The reorganization of the hospital system would suggest that the state intends to continue with its own design for medical treatment. Whether Queensland will be able to bear the economic strain of a large program for hospitalization in addition to that of national health insurance remains to be seen.

Diabetic Association

Steps are now being taken to form an Australian branch of the Diabetic Association. The parent body in London, founded about three years ago, consists essentially of persons with diabetes, together with several medical practitioners, dietitians, almoners and others who are in daily contact with sufferers from the disease. One of the chief objects of the association is the reeducation of all persons in the community as far as their outlook on persons with diabetes as a class is concerned and to spread the knowledge that such persons today are efficient and employable. The association also attempts to overcome the natural feeling of despair among patients at the discovery of their affliction. The effect of belonging to a well organized diabetic family facing a common difficulty is an important benefit, and practical instructions, hints and association news are conveyed to all members by the *Diabetic Journal*. The association provides information about the location of diabetic clinics and of boarding houses where diabetic persons receive special consideration, about holiday camps for juvenile sufferers, about local sources of insulin and other equipment, and about district nurses who visit the infirm diabetic person. While there are several members of the parent association in Australia, the great distance from headquarters, together with the different conditions, makes it scarcely possible for them to obtain the full benefits of membership. It is to provide diabetic Australians with information and social care of the type supplied in England that a branch is being formed in Australia.

Contraception and Abortion

In Australia 31 per cent of all first births are the result of extramarital conception. Also, during the last twenty years the percentage of deaths from illegal operations has been multiplied by four; it now represents 20 per cent of total maternal deaths. These facts point to a loosening of moral standards, with consequent increase in intemperate contraception and criminal abortion for the failure of contraception. Intemperate contraception and criminal abortion have destroyed and are destroying the health of thousands of women. In the opinion of Dr. McLelland man is the defaulter. He considers that the feminist movement was a frank mutiny conditioned by man's failure in the primary duty of sustenance and protection of woman. The increasing extent to which women are employed in industry and commerce, the increasingly high wages paid to women and their insistent demands for independence, and the consequent unwillingness of young women in employment to enter matrimony are important factors in the increase of abortion. Added to these is the changed attitude of men toward women.

Marriages

Paul B. Ferrary, Totowa, N. J., to Miss Ethel M. Kroger of Chevy Chase, Md., in Washington, D. C., July 20.

Elizabeth Fisher to Mr. Homer Bush Martin, both of Regina, Sask., Canada, in Eau Claire, Wis., May 21.

Herbert Perrin Harkins, Bala Cynwyd, Pa., to Miss Anna Catherine Shepler of Melrose Park, July 16.

Floyd J. Fowler, Akron, Ohio, to Miss Marian Vaughan Holoman of Rich Square, N. C., June 23.

William Boyd Turner, Carlisle, Pa., to Miss Katherine Anna Burr of Collingswood, N. J., July 9.

William Hanlon Oatway Jr. to Mrs. Margaret Ann Pyre Kenaston, both of Madison, Wis., June 4.

Charles Foss Ferguson to Miss Elsa Knutson Cosner, both of Boston, at Cambridge, Mass., June 16.

Paul G. Albrecht, Cleveland, to Mrs. Evelyn Burford Randolph of New York, August 4.

Reuben Louis Kaufman, Whittier, Calif., to Miss Lillian Skolnick of Los Angeles, June 19.

George W. Wilhite, Corsicana, Texas, to Miss Clara L. Mitchell of Taylor, March 31.

Raymond M. Waldkirch, Wayside, Neb., to Miss Fern Denys of Green Bay, June 9.

John P. Bartle, Langdon, N. D., to Miss Mercedes Mettel of Saskatoon, Sask., May 23.

Chester M. Kurtz, Madison, Wis., to Dr. Esther Caldwell of St. Croix Falls, May 21.

Ivan B. Taylor to Miss Myra Elizabeth Williamson, both of Madison, Wis., May 28.

Frederick J. Kaltever to Miss Marie Camblos, both of Philadelphia, July 14.

Roger J. Minner, Egypt, Pa., to Miss Helen A. Storm of Fullerton, July 16.

George O. Dunker to Miss Constance Keyser, both of Milwaukee, July 9.

Edwin A. Seifert to Miss Evelyn Rich, both of Glen Ridge, N. J., June 25.

Felix F. Horowitz to Miss Martha Kramer, both of Brooklyn, June 14.

Deaths

Frederick Tilney, New York, since 1914 professor of neurology and neuro-anatomy at Columbia University College of Physicians and Surgeons, New York, died, August 7, aged 62. Dr. Tilney was born in Brooklyn, June 4, 1876. He received the bachelor of arts degree from Yale University, New Haven, Conn., in 1897 and the medical degree from Long Island College Hospital, Brooklyn, in 1903. During 1903 and 1904 he studied in Berlin. On returning to this country, he worked at the Long Island College Hospital under the fellowship founded by Dr. Joshua M. Van Cott, in anatomy, embryology and nervous diseases. He became instructor in anatomy at Columbia University College of Physicians and Surgeons in 1909, about which time he reorganized the neurologic department of the Vanderbilt Clinic. From 1919 to 1924 he was director of neurology at the New York Post-Graduate Medical School. Dr. Tilney was a member of the Medical Society of the State of New York, the American Psychiatric Association, the Association for Research in Nervous and Mental Disease and the American Association of Anatomy and was also a past vice president and trustee of the New York Academy of Medicine and past president of the American Neurological Association. In 1935 he was appointed medical director of the Neurological Institute, after having been several years chairman of the institute's committee on medical research. He was also consultant in neurology at the Presbyterian, Babies, Roosevelt, Brooklyn, Methodist, Episcopal and the Greenwich hospitals. Dr. Tilney was chairman of the medical board of the State School for Delinquent Boys at Warwick, N. Y., founded in 1932. He accomplished research work, including the extensive Matheson Survey directed by the Neurological Institute to study cases of the socially maladjusted persons and criminals. In 1912 he took the degree of doctor of philosophy at Columbia for his thesis on "Contributions to the Study of Hypophysis Cerebri, with the Especial Reference to Comparative Histology," and in 1929 received the honorary degree of doctor of science. He was the co-author, with Dr. Henry A. Riley, of "The Form and Functions of the Central Nervous System"; author of a two-volume work "The Brain from Ape to Man" and of "Master of Destiny."

FREDERICK TILNEY
1876-1938

Pol N. Corylios ● New York; Université de Paris Faculté de Médecine, France, 1914; professor of surgery at the University of Greece from 1919 to 1923; came to the United States in 1923 and accepted the chair of professor of clinical surgery at Cornell University Medical College, a position he held for many years; clinical professor of thoracic surgery at the New York Polyclinic Medical School and Hospital; member of the American Association for Thoracic Surgery; fellow of the American College of Surgeons; received honors from several countries for his services during the World War; had been surgeon general in the Greek Army from 1919 to 1923; at various times director of thoracic surgery, Metropolitan Hospital and the Polyclinic, New York, and Sea View Hospital, Staten Island; thoracic surgeon to the Cornell Clinic; consulting thoracic surgeon to the Broad Street Hospital, New York, National Variety Artists Sanatorium, Saranac Lake, and Ulster County Sanatorium, Kingston; was director of surgery at the Veterans Administration Facility, Castle Point; author of "The Surgery of Pulmonary Tuberculosis"; and contributed numerous articles to publications in this country and France; aged 57; died, July 26, in the Manhattan General Hospital of lobar pneumonia and cerebral hemorrhage.

Spencer Michael Free, Du Bois, Pa. College of Physicians and Surgeons, Baltimore, 1880; member of the Medical Society of the State of Pennsylvania; fellow of the American College of Surgeons; formerly lecturer on medical ethics and economics at his alma mater; inspector for the state board of health, 1887-1905; surgeon to the Du Bois and Maple Avenue hospitals; senior surgeon to the Adrian Hospital, Punxsutawney; consulting surgeon to the Indiana (Pa.) Hospital; formerly member of the school board; aged 81; died, May 16.

Arthur Matthew Kane, Brooklyn; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1893; fellow of the American College of Surgeons; adjunct professor of dermatology and syphilology at the New York Polyclinic Medical School and Hospital, New York; served during the World War; on the staffs of the New York Foundling Hospital and the New York City Hospital; aged 70; died, June 5, of pneumonia.

Alfred Edward Maumenee, Birmingham, Ala.; Medical College of Alabama, Mobile, 1905; member of the Medical Association of the State of Alabama and the American Academy of Ophthalmology and Oto-Laryngology; fellow of the American College of Surgeons; on the staff of the Hillman Hospital; aged 58; died, June 5, in a hospital at Greenville, of heart disease.

Gilbert Dana Murray, Spring Lake, N. J.; Medico-Chirurgical College of Philadelphia, 1889; member of the Medical Society of the State of Pennsylvania and the American Laryngological, Rhinological and Otological Society; fellow of the American College of Surgeons; aged 72; died, May 22, in the Wills Hospital, Philadelphia, of a cerebral hemorrhage.

John Lincoln Porter ● Evanston, Ill., professor emeritus of orthopedic surgery at Northwestern University Medical School, Chicago, died, August 11, of coronary occlusion, aged 74. Dr. Porter was born in Alstead, N. H., July 2, 1864. He received the medical degree from Northwestern University Medical School in 1894. In 1900 he became professor of orthopedic surgery at the University of Illinois College of Medicine, where he served until 1917 when he became professor of orthopedic surgery at Northwestern. He was a member of the American Orthopedic Association, past president and for many years treasurer; member of the Western Surgical Association, the Clinical Orthopedic Society and the American Academy of Orthopedic Surgeons and fellow of the American College of Surgeons. The silver jubilee of the Clinical Orthopedic Society in October 1937 was dedicated to Dr. Porter, who founded the society twenty-five years before, when it was known as the Central States Orthopedic Club. The John Lincoln Porter Memorial Lecture was established at the meeting. Dr. Porter was consulting orthopedic surgeon to the Evanston Hospital and St. Luke's Hospital, Chicago, and for many years attending orthopedic surgeon to the Cook County Hospital, Chicago. He was appointed a member of the advisory board of orthopedics during the World War and later was a major in the medical corps.

JOHN LINCOLN PORTER
1864-1938

Charles Mortimer Culver, Delmar, N. Y.; Albany Medical College, 1881; member of the Medical Society of the State of New York, and the American Ophthalmological Society; translated under the supervision of the author, Dr. Edmund Landolt, "The Refraction and Accommodation of the Eye, and Their Anomalies"; aged 81; died, May 8.

Daniel Bailey Hardenbergh ● Middletown, N. Y.; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1891; formerly member of the board of education; on the staff of the Elizabeth Horton Memorial Hospital; aged 72; died, May 5, of cerebral arteriosclerosis and nephritis.

Robert Hughes Millwee ● Dallas, Texas; Southern Methodist University Medical Department, Dallas, 1913; member of the Radiological Society of North America and the American College of Radiology; served during the World War; on the staff of the Dallas Methodist Hospital; aged 54; died, June 22.

Fred Baker, Point Loma, Calif.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1880; member of the California Medical Association; formerly member of the board of education of San Diego; aged 84; died, May 16, in the Mercy Hospital, San Diego, of intestinal obstruction.

Charles Menger Truschel ● Wheeling, W. Va.; University of Pennsylvania Department of Medicine, Philadelphia, 1904; served during the World War; aged 58; on the staffs of the Ohio Valley General Hospital and the Wheeling Hospital, where he died, May 22, of cerebral hemorrhage and hypertension.

Arthur John Stuenkel, Hinsdale, Ill.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1904; member of the Illinois State Medical Society; on the staff of the Elmhurst (Ill.) Hospital; aged 57; died, June 4, of chronic myocarditis and coronary sclerosis.

Frederick Edward Jones ● Beaver Falls, N. Y.; Bellevue Hospital Medical College, New York, 1892; formerly secretary of the Lewis County Medical Society; for many years member of the board of education; on the staff of the Lewis County General Hospital, Lowville; aged 69; died, May 31.

James Sawyer, Mansfield, Ohio; Bellevue Hospital Medical College, New York, 1897; at one time member of the board of health of Asheville, N. C., and superintendent of health of Buncombe County; aged 64; died, June 2, in a hospital at Toledo of cerebral hemorrhage and arteriosclerosis.

William Williams Betts ● Chadds Ford, Pa.; Jefferson Medical College of Philadelphia, 1907; past president of the Chester County Medical Society; aged 64; on the staff of the Chester County Hospital, West Chester, where he died, June 12, of coronary thrombosis and bronchial asthma.

James Williams Skebelsky ● Chicago; Northwestern University Medical School, Chicago, 1907; formerly clinical assistant in dermatology and later instructor at his alma mater; on the staffs of the South Shore and South Chicago hospitals; aged 56; died, June 1, of coronary thrombosis.

Thomas Franklin Erdman, Reading, Pa.; Hahnemann Medical College and Hospital of Philadelphia, 1907; served during the World War; formerly assistant superintendent of the State Hospital, Norwich, Conn.; aged 54; died, May 21, of cirrhosis of the liver and ascites.

John Milton Mabbott ● New York; College of Physicans and Surgeons, Medical Department of Columbia College, New York, 1884; formerly secretary of the International Spanish Speaking Association of Physicians, Dentists and Pharmacists; aged 75; died, July 1.

Francis McQuillan, Washington, D. C.; Georgetown University School of Medicine, Washington, 1903; member of the Medical Society of the District of Columbia; aged 60; on the staff of the Providence Hospital, where he died, June 10, of diabetes mellitus.

William Henry Abbott, Cambridge, N. Y.; Hahnemann Medical College and Hospital, Philadelphia, 1911; member of the Medical Society of the State of New York; aged 63; died, June 8, in the Mary McClellan Hospital of tuberculosis of the spinal column.

Thomas B. Miller, Richland, Ga.; University of Georgia Medical Department, Augusta, 1875; member of the Medical Association of Georgia; formerly mayor, member of the city council and board of education; aged 84; died, in June, of pneumonia.

John Henry Rose, Geneva, N. Y.; University of the City of New York Medical Department, 1892; served during the World War; aged 71; died, May 6, in the Clifton Springs (N. Y.) Sanitarium and Clinic of arteriosclerosis and pernicious anemia.

John Patrick Cantwell McManus, New York; Queen's University Faculty of Medicine, Kingston, Ont., Canada, 1897; for many years on the staff of the Bellevue Hospital; aged 71; died, June 22, in the Kingston (Ont.) General Hospital.

Isaac Wright Short, Elkhart, Ind.; Bellevue Hospital Medical College, New York, 1888; member of the Indiana State Medical Association; aged 74; died, June 4, of gastric hemorrhage, cerebral hemorrhage and diabetes mellitus.

Samuel Stalberg ● Atlantic City, N. J.; University of Pennsylvania Department of Medicine, Philadelphia, 1902; served during the World War; aged 59; was found dead, May 13, of illuminating gas poisoning, self administered.

Bancroft Frederic Bishop, Garrattsville, N. Y.; Long Island College Hospital, Brooklyn, 1886; member of the Medical Society of the State of New York; for many years county coroner and health officer; aged 79; died, May 10.

Harold Le Fevre Van Norstrand, Kingston, N. Y.; Long Island College Hospital, Brooklyn, 1921; member of the Medical Society of the State of New York; aged 41; on the staff of the Benedictine Hospital, where he died, May 15.

Thomas Jefferson Blackwell, Nacogdoches, Texas; Barnes Medical College, St. Louis, 1910; member of the State Medical Association of Texas; aged 65; formerly on the staff of the City Memorial Hospital; died, May 23.

Pedro Perea Fajardo, Mayaguez, P. R.; Ohio Medical University, Columbus, 1905; member of the Medical Association of Puerto Rico; part owner of the Mayaguez Sanatorium; formerly mayor; aged 58; died in May.

Guy Ira Robert Lawless, Danville, Va.; College of Physicians and Surgeons of St. Louis, 1922; Kansas City College of Medicine and Surgery, 1926; aged 42; died, June 13, of illuminating gas poison, self administered.

George J. Howe, Central Falls, R. I.; College of Physicans and Surgeons, Baltimore, 1892; member of the Rhode Island Medical Society; at one time school physician and coroner; aged 69; died, June 6, of myocarditis.

John Smith Redwine, Jackson, Ky.; Kentucky School of Medicine, Louisville, 1890; member of the Kentucky State Medical Association; aged 75; died, May 28, in the Good Samaritan Hospital, Lexington.

Daniel Harmon Thweatt, Eastaboga, Ala.; Birmingham Medical College, 1915; member of the Medical Association of the State of Alabama; aged 48; died, May 27, in the Citizens' Hospital, Talladega.

Nathaniel S. Greenwood, Philadelphia; Baltimore University School of Medicine, 1896; aged 71; died, May 27, in the Anderson Hospital of cardiac disease and prostatic hypertrophy.

Anna Minerva Stanton ● Pittsburgh; Woman's Medical College of Pennsylvania, Philadelphia, 1897; aged 67; died, May 7, in the Western Pennsylvania Hospital of carcinoma of the rectum.

Joseph Clive Enos ● Charleroi, Pa.; University of Maryland School of Medicine, 1904; aged 56; died, May 4, in the Allegheny General Hospital, Pittsburgh, of edema of the brain.

Mary Jones Brewster, Wellesley, Mass.; Woman's Medical College of Pennsylvania, Philadelphia, 1892; aged 76; died, June 9, of mesenteric embolus, arteriosclerosis and hypertension.

John Marten, Tolono, Ill.; Rush Medical College, Chicago, 1897; member of the Illinois State Medical Society; for many years president of the board of education; aged 80; died, June 7.

Carl Matthias Pohl ● Chicago; Rush Medical College, Chicago, 1903; on the staff of the West Suburban Hospital, Oak Park, Ill., aged 58; died, June 3, of cerebral hemorrhage.

George Robinson Pirie, Toronto, Ont., Canada; University of Toronto Faculty of Medicine, Toronto, 1901; L. R. C. P., London, and M.R.C.S., England, 1915; aged 58; died, May 4.

Henry Nicholas Oestreich, Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1900; aged 65; died, May 28, of chronic nephritis.

James M. Fallis, Luray, Kan.; St. Joseph (Mo.) Hospital Medical College, 1878; aged 90; died, May 22, in Ontario, Calif., of coronary thrombosis.

Frank Lossing Carpenter ● Berkeley, Calif.; University of Buffalo School of Medicine, 1891; aged 70; died, May 17, of coronary thrombosis.

Lloyd Ellenberger Newcomer, Long Beach, Calif.; Rush Medical College, Chicago, 1903; aged 66; died, May 6, of cerebral hemorrhage.

Moses Chesley Roberts, Toronto, Ont., Canada; McGill University Faculty of Medicine, Montreal, Que., 1911; aged 58; died, May 23.

Joseph Louis Easton, Ayton, Ont., Canada; University of Toronto Faculty of Medicine, 1898; aged 69; died, May 5.

John Albert Gallagher, Toronto, Ont., Canada; University of Toronto Faculty of Medicine, 1905; died, May 7.

Bureau of Investigation

CALDWELL'S SYRUP PEPSIN

The Federal Trade Commission Proceeds Against the Concern That Puts Out This Nostrum

A "patent medicine" of the laxative type has for years been sold under the misleading name "Syrup Pepsin." It is put out by "Dr. W. B. Caldwell, Inc.," of Monticello, Ill. For many years the name of the concern was Pepsin Syrup Company, but the name was changed to the present style about 1933.

Like the majority of "patent medicines" that have been in existence for thirty or more years, Syrup Pepsin, in its labeling, has undergone the usual changes from the "lie direct" to the "lie with circumstance." Before the days of the Food and Drugs Act of 1906, when lying on the label was merely immoral but carried with it no penalties, Syrup Pepsin was described as:

"A Cure for Stomach Troubles Such as Dyspepsia, Biliousness, Sick Headache, Sour Stomach and Heartburn; also Liver Troubles, Constipation and Ills Caused from Bad Digestion."

At that time the full title of the product was "Dr. W. B. Caldwell's Syrup Pepsin and Herb Laxative Compound." The words "Syrup Pepsin" were set in large, black-faced type (36-point capitals), while the words "Herb Laxative Compound" were set in very much smaller capital and lower-case type. After the Food and Drugs Act of 1906 penalized lying on the label, the claims were modified and it became no longer "A Cure" but:

"A Reliable Remedy for Constipation and Such Other Stomach Troubles as Dyspepsia, Biliousness, Sick Headache, Sour Stomach, Foul Breath, Heartburn, Liver Troubles, Etc."

Before the Food and Drugs Act the trade package described this preparation, in part, as "A Perfect Digestive Compound Composed of Pure Pepsin Combined with Plant Drugs Known to be Beneficial to the Human System . . ."

The 1938 carton describes the product as "Dr. W. B. Caldwell's Syrup Pepsin Combined with Laxative Senna Compound." The words "Syrup Pepsin" are still in the large 36-point, all-capital, black-faced type, but the supplementary description, "Laxative Senna Compound," is set in considerably larger type than the old description "Herb Laxative Compound" used to be, although it is still not as large as the "Syrup Pepsin" part of the label. The present carton no longer describes the preparation as a "Perfect Digestive Compound," but as "A Pleasant Laxative Compound," and the other claims are considerably milder, for today it is described as:

"A Laxative for Constipation and Associated Headaches, Sour Stomach, Biliousness, Colic and Cramps Due to Gas and Temporary Restlessness and Depression."

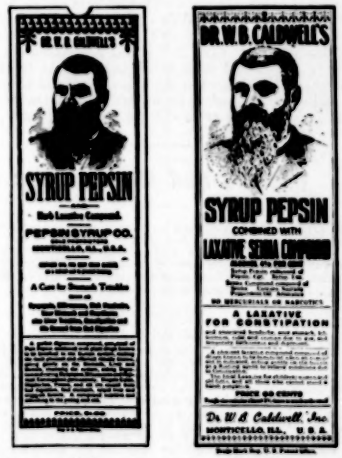
What Syrup Pepsin used to contain, nobody knew except the manufacturers and such chemists as might have analyzed it. The only information the old trade package used to give was that required under the Food and Drugs Act of 1906, namely, the alcohol percentage, which was given at that time as 8½ per cent. Today the alcohol is declared as 4½ per cent, and the package also states in small type that Syrup Pepsin contains 4 grains of pepsin to each ounce of syrup, while the "senna compound" is composed of senna, cascara sagrada, peppermint oil and aromatics. No quantities are given regarding the amount of senna and cascara, which are really the only drugs in the nostrum that mean anything.

There was a Dr. W. B. Caldwell and, in fact, he was one of the directors of the company many years ago. Dr. Caldwell died of senility in 1922. In spite of this fact, Syrup Pepsin was being advertised eight years after Caldwell's death with a large window display for drug stores in which Dr. W. B. Caldwell and a group of girls formed what was described as a "startlingly life-like presentation of the old doctor."

Nearly a quarter of a century ago (July 31, 1915) this department of THE JOURNAL published a brief article on this "patent medicine" and brought out the fact that the product was essentially a senna preparation. Some three years earlier (in 1912) Dr. L. F. Kebler, who was then chief of the Division of Drugs of the Bureau of Chemistry of the Department of Agriculture, classed Caldwell's Syrup Pepsin among "products for which false or fraudulent claims are made." Dr. Kebler stated that the preparation was "an aqueous-alcoholic solution containing laxatives flavored with oil of peppermint. Pepsin is absent or not present in appreciable amounts." In 1915 the state chemists of Connecticut reported on Caldwell's Syrup Pepsin and stated that it was a senna preparation containing little if any pepsin.

The present case of the Federal Trade Commission against this nostrum is based, as all such cases under the law must be, on the charge that Caldwell's Syrup Pepsin is sold by methods that constitute unfair competition. The fact that a nostrum may be a fraud on the public did not, under the law, permit the Federal Trade Commission to act against it. It was only when preparations were sold under claims that brought them into unfair competition with other products of the same class that the commission could take action.

Among the false claims under which the commission charges that Caldwell's Syrup Pepsin is sold is one to the effect that the preparation is a "doctor's prescription." In the very nature of the case, a "patent medicine" cannot be a doctor's prescription, for a prescription is an order on a drug store for a certain drug or combination of drugs in certain definite proportions,



OLD NEW

Greatly reduced reproductions of the old and present (1938) cartons. Note how the name "Syrup Pepsin" dominates the label; yet the pepsin is wholly without action as a laxative.

to be taken in equally definite dosage for some specified person at some particular time. It would be just as rational for a ready-made tailoring concern to put out a line of men's suits, all of one size and factory made, and advertise them as tailored to order.

Another claim made for the Caldwell nostrum was that it was not a habit-forming laxative. As all laxative drugs are potentially habit forming, the claim would be recognized as obviously false by physicians, but it would not be so obvious to the non-medically trained person. As Fantus has so well put it: "Cathartics are habit-producing drugs, admissible only in cases of temporary disturbance . . ."

But the gist of the Federal Trade Commission's case against Caldwell's Syrup Pepsin was the misleading name of the preparation. As William L. Taggart, attorney for the commission, pungently puts it in his brief: "The name Syrup Pepsin and advertising clearly indicate to a person that they would not be taking an ordinary laxative preparation, and they

are getting something more than a laxative, something which possesses a curative effect upon various ills of man and they should continually have it on hand and take it."

The Syrup Pepsin people introduced one scientific witness, a chemist, one Harvey A. Seil. The brief brings out the fact that "Seil wandered far from the field of chemistry to that of internal medicine." Of course, the Caldwell concern filed exceptions to the Trial Examiner's findings. These "exceptions," the commission's brief stated, were "full of loose talk and impertinence, and attempt to attack the good faith of the entire proceeding." One piece of "loose talk" by the company's lawyers in the exceptions reads:

"The recklessness of these charges raises the suspicion that they were made for an ulterior purpose possibly instigated by some individual or group who dislikes home remedies for common ailments and would like to have their sale forbidden."

The same old bugaboo that is always raised by "patent medicine" interests when the questions of fraud, misrepresentation and deceit are raised. The old charge—by implication—that the medical profession objects to the sale of "patent medicines" because it cuts into their business, when, as every physician knows, "patent medicine" advertising sends more patients to the doctor's office than does an epidemic. The charge is an ancient, evil smelling red herring drawn across a trail that is already sufficiently malodorous.

The article that appeared in this department of THE JOURNAL twenty-three years ago on Caldwell's Syrup Pepsin ended with this sentence: "The lack of any appreciable quantity of pepsin . . . would seem to indicate that the name would constitute misbranding under the federal Food and Drugs Act." We still think so, and it seems strange that Dr. Caldwell's Syrup Pepsin was never so charged under that law.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

HAY FEVER AND ARTHRITIS

To the Editor:—A man aged 67 had more than average good health all his life but was a victim of hay fever. In the spring of 1936 he complained of some pain and slight swellings, at first principally in the joints of his fingers and in his wrists. In the last six months he has been confined to the house with a general arthritis. The teeth, tonsils and prostate have been investigated. In the fall of 1936 he had no symptoms of hay fever and again last year he was free from all symptoms of it. In forty-five years' experience I do not recall a similar case. Is it a mere coincidence or are there other cases like it? Could symptoms of hay fever again be activated in the patient and thereby, by the process of "shock," possibly have a favorable effect on the arthritis?

M. L. BARSHINGER, M.D., York, Pa.

ANSWER.—It is implied that there may be some connection between the appearance of the arthritis and the disappearance of hay fever and vice versa. Although the data are insufficient to allow one to be certain of the diagnosis, the patient presumably has generalized arthritis of the atrophic variety. Many investigators believe that atrophic arthritis, rather than being antagonistic to any allergic state, is in itself a manifestation of allergy and frequently associated with other allergic reactions. Some regard atrophic arthritis as a reaction to bacterial or food allergens. Some (Brown) contend that atrophic arthritis can be made worse by subsequent attacks of food hypersensitivity, but Bauer never saw a case of atrophic arthritis traceable to food allergy. Young noted that patients with atrophic arthritis are apparently abnormally susceptible to skin allergy (urticaria and allergic dermatitis) but not to hay fever or asthma. He could not prove any connection between arthritis and food allergy. In particular Wolf and Freeman have concluded that the relationship between arthritis and allergy remains unproved. In this case there is probably no direct connection between the appearance of the arthritis and the disappearance of the hay fever except that as the patient is confined to the house he is less exposed to those pollens which offend him. As people grow older their hay fever often becomes less severe and the disease sometimes stops as suddenly as it appeared in youth.

References:

Bauer, Walter: What Should a Patient with Arthritis Eat? THE JOURNAL, Jan. 5, 1935, p. 1.
Brown, G. T.: Allergic Phases of Arthritis, *J. Lab. & Clin. Med.* **20:** 247 (Dec.) 1934.
Freeman, J.: The Present Position of Allergy and Hypersensitiveness in Chronic Rheumatism and Arthritis, in Reports on Chronic Rheumatic Diseases, London, H. K. Lewis & Co., Ltd., 1935.
Wolf, H. F.: Is Arthritis an Allergic Disease? *M. Rec.* **139:** 527 (May 16) 1934.
Young, A. G.: Occurrence of Allergic Reactions in Arthritic Patients, *New England J. Med.* **214:** 779 (April 16) 1936.

EPINEPHRINE, MORPHINE AND SALICYLATES IN ASTHMA

To the Editor:—I have often heard physicians express the opinion that asthmatic patients should not have epinephrine and morphine administered together or following each other within a few minutes. Is this true? If so, what is the scientific basis for it? I have also heard that acetylsalicylic acid is contraindicated in asthma.

CLAUDE ANDERSON, M.D., Orlando, Fla.

ANSWER.—The older school of physicians used a great deal of morphine in the treatment of asthmatic attacks. Considerable success followed; relief was obtained in most cases; nausea and vomiting frequently followed, however, and the danger of hypersensitivity and of addiction were always present. But better methods of diagnosis and more experience have shown that morphine is the drug of choice in "cardiac asthma," that type of sudden dyspnea which occurs in older persons, especially those who have high blood pressure, nephritis or aortic regurgitation. Morphine in large doses works well in such cases and should be given promptly and in doses of from 0.016 to 0.03 Gm. (one-fourth to one-half grain) hypodermically, repeated if necessary. Epinephrine in this group is not indicated; in fact, it may be harmful.

In bronchial asthma, which usually occurs in children and young persons, epinephrine is the drug of choice; in most instances it works promptly and effectively and aside from temporary nervous effects it is relatively harmless and not habit forming. Unfortunately, in a small percentage of cases the asthma is not relieved and epinephrine may be injected frequently and with but little effect; the patients are often in an alarming condition: cyanosis, dyspnea, orthopnea, tachycardia, weakness and inability to take nourishment combine to alarm the patient, the family and the physician. When morphine is given the patient is frequently quieted for some time, but not rarely death ensues suddenly. The explanation is probably as follows: The patient is already in a state of anoxemia, as shown by cyanosis; his bronchial tubes are plugged by inspissated mucus (this has frequently been demonstrated at necropsy); the morphine probably lessens the cough reflex and so increases the obstruction; perhaps the morphine also acts by depressing the respiratory center of the brain. Morphine may also act allergically, causing an acute reaction. In any case the combination of epinephrine and morphine is fraught with danger. Most allergists believe that morphine should be used rarely in bronchial asthma and many never use it at all. In these severe cases of intractable asthma the specialists in this field are apt to try other measures; e. g., 1 cc. of epinephrine may be put into a 2 cc. hypodermic syringe; the needle is inserted intravenously and 1 cc. of blood is drawn up into the syringe; the mixture is then injected slowly into the vein. This works in many cases in which epinephrine subcutaneously fails. Other measures are general anesthesia as advocated by Kahn (*J. Allergy* **8:**158 [Jan.] 1937) ether rectally, and various other sedatives. One reassuring factor is that if morphine is not used most of these patients sooner or later emerge from the severe phase of the attack and death is rare unless morphine is given. Many reports on this subject are in the literature; e. g., Dehner (*Klin. Wchnschr.* **6:**1412 [July 23] 1927) warns against the use of morphine in discussing two fatal cases of asthma.

The use of acetylsalicylic acid in asthma depends entirely on whether or not the patient happens to be hypersensitive to this drug. If he has previously taken it without trouble he can almost certainly continue using it. Many patients are much benefited by its use. But if the patient has an idiosyncrasy to the drug he must avoid it as he would the most drastic poison, because even a grain or less may throw him into an acute attack of bronchial asthma even to the point of fatality. Not only must he avoid acetylsalicylic acid but also drugs which contain it, such as "Alka-Seltzer." Other coal tar products must be used cautiously, although patients hypersensitive to acetylsalicylic acid can usually tolerate aminopyrine, acetanilid

and sodium salicylate. A wise rule before prescribing is to question all allergic patients as to possible drug idiosyncrasies. Such care pays dividends. Many reports on idiosyncrasy to acetylsalicylic acid are in the literature. Duke (*J. Allergy* 4:425 [July] 1933) suggests testing allergic patients by placing a minute granule of acetylsalicylic acid beneath the tongue. Hypersensitivity will be shown within a few minutes by the usual symptoms of drug idiosyncrasy: angioneurotic edema, urticaria, rhinitis or asthma. Further symptoms may be prevented by rinsing the mouth with dilute acetic acid (vinegar). Prickman and Buchstein (Hypersensitivity to Acetylsalicylic Acid [Aspirin], THE JOURNAL, Feb. 6, 1937, p. 445) recently reviewed the subject and reported cases of their own.

TREATMENT OF BUERGER'S DISEASE

To the Editor:—What is the best treatment for Buerger's disease?

JOHN W. BOLEN JR., M.D., Beckley, W. Va.

ANSWER.—The use of tobacco in any form should be denied every patient who has thrombo-angiitis obliterans. It is important that the feet be cared for properly if gangrene is to be prevented. A regimen similar to that described for the care of the feet in diabetes is advisable. Preparations containing iodine, merthiolate, sulfonapthol, phenol (carbolic acid), cresol and saponated solution of cresol should be avoided, as they may cause ulceration or gangrene. Trichophytosis should be actively treated but not with preparations containing salicylic acid, as they may cause ulceration. A safe method of treatment is to soak the feet for half an hour twice daily in a 1:8,000 solution of potassium permanganate.

Local application of heat is advisable and may be applied in the form of radiant heat from carbon filament bulbs placed in a cradle or baker. The temperature about the feet should not exceed 105 C. Exposure to this temperature for an hour two or three times a day is advisable. Warm sitz baths, using water as warm as can be tolerated comfortably, may be used for periods of ten to twenty minutes one to three times each day. Electric pads or hot water bottles should never be applied directly to the skin. Postural exercises may be helpful. The patient should elevate the extremities for one minute, then place them in the dependent position until the rubor becomes maximal and then lie with them in a horizontal position for one minute. These procedures should be repeated five times, two or three times a day. Contrast baths may be advisable. There should be two containers, each large enough to immerse both feet to the midleg. In one container is placed cold water of from 40 to 50 F. and in the other warm water of from 102 to 105 F. The feet are alternately immersed in the water in each container for one minute during a period of about fifteen minutes. This procedure can be repeated two or three times a day. In some instances intermittent suction and pressure (passive vascular exercise) treatment should be carried out for two or three hours daily. Some physicians believe that this method of treatment is valueless, but it is worth a trial in most cases. Intermittent venous obstruction is considered advisable by some physicians. While machines are available which perform this treatment automatically, it can be carried out by placing the cuff of a sphygmomanometer about the thigh or arm. The cuff is inflated to a pressure of about 80 mm. of mercury for two minutes and then deflated for two minutes. This treatment should be carried out for a minimum of four or five hours daily. Some authors feel that a diet high in calcium or the addition of half a teaspoonful of calcium lactate or a heaping teaspoonful of calcium gluconate is advisable an hour before meals. Injections of 250 cc. of 2 per cent solution of sodium citrate as often as every day or as infrequently as two or three times a week for a considerable period may help. The solution is injected at the rate of from 7 to 8 cc. a minute. Injections of hypertonic solutions of sodium chloride may aid. In cases of thrombo-angiitis obliterans without gangrene these injections are given in amounts of from 250 to 350 cc. of a 3 to 5 per cent solution twice or three times a week for about three months. Then the frequency of injection is gradually diminished for about six months. In cases of gangrene, injections are given three times each week until healing occurs or until hopelessness of further treatment has been established. The solution should be injected through a 19 gage needle at the rate of about 30 cc. a minute. One of the best methods of increasing the circulation in thrombo-angiitis obliterans is the repeated induction of fever by means of the intravenous injection of typhoid vaccine. For the convenience of administration, a stock solution should be diluted with physiologic solution of sodium chloride so that 1 cc. contains 100,000,000 killed bacteria. The desired reaction is elevation of the oral temperature to from 101 to 102 F. Chill, headache and malaise may result. Excessive elevation of the oral temperature, severe chills and serious malaise are not necessary and are to be avoided if possible. The original injection contains from 15,000,000 to 25,000,000 bacteria for a man and from 10,000,000 to 15,000,000 for a woman. Ordinarily, each subsequent dose is increased by from 15,000,000 to 25,000,000 bacteria but the amount injected depends on the reactions. If the reaction to any injection is too severe, the subsequent injection should be increased only slightly or not increased at all. If the reaction is too mild, the next injection should contain from 25,000,000 to 50,000,000 bacteria more than the preceding one did. Injections may be given once or twice a week for six or eight weeks, after which a rest period of several weeks is advisable before another course is begun. Contraindications to the intravenous injection of typhoid vaccine are advanced debilitating diseases, diseases of the coronary and cerebral arteries, chronic nephritis, myocardial insufficiency, active pleurisy or pericarditis, latent or quiescent appendicitis, and cholecystitis. Vasodilating drugs are ordinarily of little use in the treatment of thrombo-angiitis obliterans, since the vasodilating effects are ordinarily slight and transient.

Intermittent claudication can be treated by the use of tissue extracts, most of which do not cause any significant improvement in circulation but only allow the patient to exercise longer before the distress of claudication occurs. Pancreatic tissue extract, supplied by Sharp and Dohme under the label "tissue extract number 568," can be injected into the deltoid muscle in doses of 3 cc. about twice a week.

Severe pain may affect the extremities when the patient is at rest, when trophic changes are present or when the skin is unbroken. In many instances morphine or diladid must be used, but habituation should be avoided. Codeine sulfate is efficacious in many instances. The artificial induction of fever by means of the intravenous injection of typhoid vaccine may produce startling relief. Other measures such as intermittent suction and pressure, intermittent venous obstruction and intravenous injection of solution of sodium citrate and sodium chloride should be tried. When pain does not respond favorably to these measures and the patient loses morale and weight and is unable to sleep, section or crushing or injection of alcohol into the posterior tibial, peroneal and sural nerves may produce anesthetization of the skin and relieve pain. In other instances it is advisable to inject alcohol into the spinal canal for the purpose of affecting the posterior nerve roots. Either of these procedures should be carried out only by experienced surgeons.

Gangrene should be kept clean and the extremity should be soaked for from two to four hours daily in a warm saturated solution of boric acid, a 1:8,000 solution of potassium permanganate or a 0.5 per cent solution of chloramine-T. In some instances débridement may be advisable. It is only rarely that a toe can be successfully amputated, for the incision ordinarily does not heal. When fingers are amputated, on the contrary, the wounds almost invariably heal. Other measures, such as those mentioned in the preceding paragraphs, should be used. When massive gangrene affects an entire foot, amputation is ordinarily the best solution. In about 80 per cent of the cases healing follows amputation of the extremity below the knee but it is occasionally necessary to perform reamputation above the knee. Necessity for amputation of the forearm has never been observed.

Removal of the sympathetic nerve supply to the extremity is performed for the single purpose of increasing the blood flow. This procedure does not ordinarily affect intermittent claudication or prevent recurrence of the superficial phlebitis or progression of the disease. It does, however, increase the blood supply to nearly maximum and minimizes the danger of gangrene necessitating amputation. It should be carried out only when trophic lesions are minimal and healing, or when they are entirely absent and when pain which occurs during rest has been almost entirely relieved or is entirely absent. Whether or not the blood supply can be significantly increased by sympathectomy can be determined by thermometric study of the extremity following the artificial induction of fever by typhoid vaccine.

References:

Allen, E. V., and Brown, G. E.: Thrombo-Angiitis Obliterans: A Clinical Study of 200 Cases: II. Treatment and Prognosis, *Ann. Int. Med.* 1:550 (Feb.) 1928.

Allen, E. V.: Some Diseases of the Peripheral Arteries, *Journal Lancet* 58:80 (Feb.) 1938.

Barker, N. W.: Results of Treatment of Thrombo-Angiitis Obliterans by Foreign Protein, THE JOURNAL, Sept. 19, 1931, p. 841.

Bernheim, Alice R., and London, Isabel M.: Arteriosclerosis and Thrombo-Angiitis Obliterans: Report of Cases and Treatment, THE JOURNAL, June 19, 1937, p. 2102.

Brown, G. E.; Allen, E. V., and Mahorner, H. R.: Thrombo-Angiitis Obliterans: Clinical, Physiologic and Pathologic Studies, Philadelphia, W. B. Saunders Company, 1928.

Herrmann, L. G.: Passive Vascular Exercises and the Conservative Management of Obliterative Arterial Diseases of the Extremities, Philadelphia, J. B. Lippincott Company, 1936.

REACTIONS AFTER TETANUS ANTITOXIN

To the Editor:—A cattle ranchman, aged 24, was using a pocket knife to trim a horse's tail; he dropped the knife, which stuck deeply into the calf of the leg, making it bleed profusely. This was June 10. A doctor gave him tetanus antitoxin (probably 1,500 units) into the outer upper left arm. He didn't scrub the arm with a brush and soap and water but used only an alcohol swab. During the night of June 10 the patient's arm began swelling and itching; it became swollen to the finger tips and brawny and red. The next day at noon the pulse rate was 104, the temperature 103 F. The eyes were red. The head ached. The neck was slightly stiff. There was paralysis of the left arm. The shoulder was painful and lame. The right arm was swollen and he had severe backache and pain in both knees and calves of the legs. There were anorexia, restlessness and sleeplessness. The treatment was hot water baths including the shoulder and entire arm alternating with cold. Ten cc. of metaphen was injected intravenously with magnesium sulfate by mouth. Two dozen tablets of sulfanilamide were given, three tablets three times a day. Sedatives were administered for rest. Forced fluids and a nourishing liquid diet (beef broth, oyster soup) were prescribed. There was an improvement overnight, the temperature decreased and the swelling and redness of the arm disappeared; but the calves of the legs and knees "feel drawn" and the patient walks "string haltered," raising the knees high at each step. That is the only remaining infirmity. What causes it? Could the tetanus antitoxin have been old or polluted? I don't know what brand was used or how fresh it was. Should I give him more? Are the "lame legs" beginning tetanus or the result of a beginning general septicemia affecting the knee joints and calves? Shall I take a watchful expectancy attitude or give him more metaphen and fresh antitoxin? An outline of treatment with diagnosis of his gait would be appreciated. The punctured wound in the limb is healing and there is no pus or any drainage. The wound was not swabbed out, as it was bleeding so much and was only the size of a small knife blade. He is afraid of any more needle punctures and of tetanus antitoxin.

M.D., Colorado.

ANSWER.—This patient probably suffered an early serum reaction. Serum sickness as a rule is much later in appearing than in this case but if the patient is congenitally sensitive to serum or if serum has been administered previously, the symptoms may come on with almost the rapidity of anaphylactic shock. It is not necessary for the serum to be old or contaminated to produce such a reaction. All the symptoms described, with the exception of the gait, are commonly seen in serum sickness. Transient neurologic phenomena, which would account for the peculiar gait, have been infrequently described in this country but have been rather frequently mentioned in the French literature.

It is difficult to explain the lame legs as a phenomenon of tetanus. They were present the day after the accident. Tetanus as the result of a wound of the leg in an adult is extremely unlikely to appear in less than a week. Tetanus in any case earlier than three days is a great rarity. A beginning general septicemia seems equally unlikely. Such an event should be accompanied by more severe general symptoms. It is altogether likely that the residual symptoms will gradually disappear without treatment.

More antiserum would be likely to produce a reaction even more serious than the initial one. Fatal collapse has followed such procedures. In the World War tetanus was nearly abolished by the use of a single prophylactic injection of antiserum. Tetanus is rather uncommon in persons who are constantly exposed to the organism. These facts would make the appearance of tetanus in this patient a rather remote possibility. In spite of this feeling of relative safety, the patient should be watched for several weeks. If frank symptoms of tetanus appear he should be vigorously treated, but he must be desensitized before any quantity of serum is administered.

ALKALOSIS

To the Editor:—Please give the physiologicochemical reactions that occur when one gives (1) saline solution, (2) Ringer's solution and (3) Hartmann's solution in (*a*) alkalosis and (*b*) acidosis.

M.D., Tennessee.

ANSWER.—Alkalosis designates an increase in the bicarbonates (alkali reserve) of the blood above the normal level, as from ingestion or administration of alkalis to the extent that elimination by the kidney or bowel is not sufficient to prevent accumulation in the blood, or represents an abnormal increase in the p_H of the blood, as from overventilation (excess breathing) leading to excess loss of carbon dioxide from the blood with the resulting reduction of carbonic acid in proportion to bicarbonate (uncompensated gaseous alkalosis). Treatment of alkalosis, varying with the condition which produced it, is directed toward the correction of the disturbed acid-base balance and dehydration. If the condition is due to excessive alkali ingestion, the alkali should be discontinued and saline solution should be forced by mouth to enable excretion of the excess alkali. Physiologic solution of sodium chloride in large amounts will help to restore the normal electrolyte pattern in the blood. Alkalosis produced by vomiting, in which severe chloride loss and dehydration occur, should be treated by intravenous injection of large amounts of saline solution (1,000 cc. of 1 per cent sodium chloride every three hours). Alkalosis due to overventilation (acapnial alkalosis) may be relieved by rebreathing a 5 per cent carbon dioxide-oxygen mixture.

Acidosis is the term applied to the diminution to a subnormal level of the reserve supply of fixed bases in the blood but has been loosely used to indicate also a decrease in the p_H of the blood. Only severe acidosis is of clinical importance, as in diabetes mellitus, in the terminal stages of chronic nephritis, in Asiatic cholera and in shock, burns, poisoning and fasting. Acidosis is most commonly caused by diabetes in which there is excessive production of beta-hydroxybutyric and acetoacetic acids from deranged fat and protein metabolism (the condition for which Naunyn originally introduced the term acidosis). In almost all cases of acidosis there is dehydration and loss of base, and treatment consists in rapidly restoring the water balance and acid-base equilibrium to normal by administration of large amounts of a solution which supplies base and water, thus increasing the blood volume, blood pressure, plasma carbon dioxide and urinary output, alleviating coma and offsetting the danger of shock. In mild acidosis the patient is not in coma; sodium bicarbonate is therefore not necessary and considerably less solution is required for restoration of the normal water and base balance.

It may be noted from the foregoing that sodium chloride solution (1 per cent), Ringer's solution (0.65 per cent sodium chloride, 0.030 per cent potassium chloride, 0.025 per cent calcium chloride, 0.020 per cent sodium bicarbonate and 0.001 per cent sodium biphosphate) and Hartmann's solution (lactate-Ringer's solution; 0.20 per cent lactic acid as sodium lactate, 0.6 per cent sodium chloride, 0.04 per cent potassium chloride and 0.02 per cent calcium chloride) all have their places in the treatment of alkalosis or acidosis. Sodium chloride solution overcomes the dehydration and salt depletion; Ringer's solution, in addition to overcoming water and salt depletion, supplies bicarbonate; lactate-Ringer's solution supplies water, base chloride, base bicarbonate and antiketogenic effect. Sodium chloride solution in alkalosis and mild acidosis and Ringer's solution in severe acidosis are the fluids of choice. Lactate-Ringer's solution may be used for the treatment of dehydration with a moderate degree of acidosis or alkalosis.

SODIUM THIOSULFATE IN ARSENIC POISONING AND RAYNAUD'S PHENOMENON

To the Editor:—I would appreciate information as to the treatment of Raynaud's disease and arsenic poisoning with sodium thiosulfate.

R. O. WHARTON, M.D., Gary, Ind.

ANSWER.—Diametrically opposed opinions have been held by various authors relative to the efficacy of the administration of sodium thiosulfate in the treatment of poisoning with arsenic. The subject has been reviewed by Ayres and Anderson (THE JOURNAL, March 19, 1938, p. 886), who have made determinations for arsenic on the urine of forty-nine patients with a variety of cutaneous disorders for which arsenic was suspected as being a possible etiologic factor. Of these patients 8 per cent did not have arsenic in the urine either before or after injection of sodium thiosulfate. The urine of 12 per cent showed less arsenic after than before injection of sodium thiosulfate, and the urine of 80 per cent showed an increase of arsenic after injection of sodium thiosulfate. These authors consider it unequivocally proved that an increase in the excretion of urinary arsenic usually follows the injection of sodium thiosulfate. Most students of the subject agree that in arsenism the use of sodium thiosulfate is of value but clinical experience indicates that it is most efficacious in treating the acute manifestations of arsenic poisoning.

The inquirer's question intimates that there is a relationship between arsenic poisoning and Raynaud's phenomenon. That such a relationship exists has been contended by Kraetzer (*New York State J. Med.* **35**:1130 [Nov. 15] 1935). He treated seven patients with Raynaud's phenomenon, the urine of all of whom contained arsenic after treatment with sodium thiosulfate. In all instances Raynaud's phenomenon disappeared entirely or was greatly improved after treatment over varying periods with sodium thiosulfate. Another investigator studied the urine of eight patients following the intravenous injection of sodium thiosulfate and was unable to demonstrate significant amounts of arsenic in the urine of any of them. Kraetzer feels that lead may occasionally be the etiologic basis for Raynaud's disease, but another investigator who has treated more than 500 cases of carcinoma with lead has noted that none of the patients so treated had manifestations of Raynaud's disease. The subject

is far from settled but it seems desirable to try the effect of intravenous administration of sodium thiosulfate on the Raynaud phenomenon. The drug should be given intravenously twice a week in doses of 0.5 Gm. The solution should be made up fresh from highly purified crystals.

APPENDICITIS AND DISEASE OF LUNG

To the Editor:—During the last four years I have operated in four cases of gangrenous appendix. In each case I was hesitant about operating because of rales in the base of the right lung posteriorly. The rales were of the fine crepitant type; being in doubt as to whether I was dealing with pneumonia or appendicitis, I was always hesitant to operate until signs became definite. In the last case an embolism occurred in the base of the right lung posteriorly two days after operation. It was a large occlusion involving about half of the lung. Is there any connection between a gangrenous appendix and the right side of the chest? Is there any weakness which would cause the right lung to become involved after an operation of this sort? All these operations were done under spinal anesthesia and all the appendixes were definitely gangrenous.

L. C. POMAINVILLE, M.D., Wisconsin Rapids, Wis.

ANSWER.—There is no known direct connection between appendicitis and pathologic conditions in the right chest. The fact that the appendix was gangrenous does not alter the connection. Rarely a subphrenic abscess will occur after a ruptured appendix and will secondarily involve the pleura above the diaphragm. In the case described as an embolism in the base of the right lung posteriorly it is not impossible that this was rather an atelectasis or partial collapse occurring as a result of a mucous plug in the bronchus. Atelectasis may occur with spinal anesthesia and is not really infrequent. The best prophylaxis against massive collapse (atelectasis) is the avoidance of undue preliminary medication. In some places morphine has been abandoned entirely. Differential diagnosis between pneumonia and appendicitis is usually not difficult except in young children. In adults, in cases of pneumonia, the entire right rectus is usually rigid, which is less frequently the case in appendicitis. In addition, of course, there are abnormalities of the lung observed through auscultation, increased respiratory rate, and possibly a cough.

RECURRENT CORNEAL ULCERS

To the Editor:—A woman, aged 63, has had recurrent corneal ulcers in each eye; about five in one year. For the last two months I have given her ABD capsules twice a day but this week she has had a recurrence. The urine and blood are normal in all respects. The blood pressure is normal. She is 5 feet 3 inches (160 cm.) tall and weighs 130 pounds (59 Kg.). She had been well until two years ago, when she began to have pain in the upper left quadrant and lost 30 pounds (13.6 Kg.) because certain food distressed her. A complete gastrointestinal examination was made and the last part of the transverse and the first part of descending colon were found to overlap each other entirely. Stomach analysis gave negative results. She was given a low residue diet and she has gained 10 pounds (4.5 Kg.) and has little pain in the abdomen. Is it possible that this intestinal condition has anything to do with the frequent corneal ulcers? Would there be any way to prevent these recurrences or anything further to look for as the cause of this condition?

LOUIS S. BOZH, M.D., Conway, Mass.

ANSWER.—If the recurrent ulcers are of the usual catarrhal type they may be caused by an accompanying conjunctivitis. The use of 0.2 per cent zinc chloride solution three times a day may clear up the conjunctivitis and prevent recurrences. Larger doses of vitamin A may also be of benefit, twenty drops of halibut liver oil or sixty drops of carotene a day being probably sufficient. Blepharitis, if present, should be treated. The intestinal condition may be an indirect factor by lowering the general nutrition.

INTOXICATION OR CEREBRAL CONCUSSION

To the Editor:—How often does cerebral concussion simulate intoxication? I am interested in knowing how often patients held for intoxication are later found to be suffering from cerebral concussion.

M.D., Wisconsin.

ANSWER.—Simple cerebral concussion rarely if ever simulates intoxication. When it does occur it should be relatively easy to differentiate between them. In simple concussion of the brain without fracture or compression there is usually some disturbance of consciousness ranging from momentary "seeing stars" to temporary unconsciousness. Severe or prolonged stupor or deep coma is not characteristic of simple concussion. These conditions indicate much more grave brain damage or injury. In intoxication the breath has the characteristic odor, the stomach content has alcohol in it and the blood stream is positive for alcohol. There are usually multiple and variable neurologic signs of alcoholism. These are tremulous hands, positive Quinquaud's sign, tremulous speech, tremulous tongue, rapid pulse and a varied type of mental and emotional behavior ranging from violence and garrulousness to an ordinary depressed or sleepy state. Many cases of concussion of the brain result from the indiscreet use of alcohol and an automobile. In a large hospital of 3,300 beds there is an average daily admission of about ten cases of acute alcoholism with lacerations of the scalp. These patients are observed for forty-eight hours for development of complications or objective evidence of organic disease. If none occur at the end of this time they are sent home with the advice to return for a second examination in one week. It is a rare occurrence to have a person held in a police station for intoxication when that person is suffering a cerebral concussion. Severe craniocerebral injuries in association with alcohol must be treated and observed for a period from fourteen to twenty-one days, depending on the extent of craniocerebral damage.

SODIUM TETRATHIONATE IN CARBON MONOXIDE POISONING

To the Editor:—In August 1933 a report was published in the local newspaper referring to the chemical "Sodium Tetra-Thionate," which was used as a specific therapeutic agent in carbon monoxide poisoning. I have never seen any reports published in the literature and no further mention has been made of this agent. Since I have a supply of this substance and since I have a fair number of these cases, I would appreciate any information you can supply as to use, mode of administration, action and dosage of this drug.

M.D., New Jersey.

ANSWER.—No reports on this subject have been discovered in scientific or medical literature. There is no general reason to suppose that so mild an oxidizing agent as sodium tetrathionate would be of any value in carbon monoxide poisoning. Its effect, like that of methylene blue, might tend to produce methemoglobin and thus exacerbate the ill effects of carbon monoxide.

MALIGNANT HYPERTENSION AND TERMINATION OF PREGNANCY

To the Editor:—A white woman, aged 29, four and one-half months pregnant, has an atrophied and functionless left arm and drags the foot when she walks. This followed a hemorrhage into the internal capsule in August 1937. The blood pressure was 230 systolic, 140 diastolic. The urine was normal. In spite of the fact that she was extremely desirous of having a child, even at the expense of her own life, I demanded the termination of the pregnancy and she reluctantly consented. She was admitted to a hospital in a neighboring town, but after the consulting surgeon examined her he thought best to watch her carefully until seven and one-half to 8 months and then do a cesarean section. If she developed signs of increasing toxemia, he maintained that the abortion at that time would be attended by no more danger than if it was done now. I myself feel that if this woman is allowed to continue her pregnancy to eight months she will certainly have a permanently damaged kidney function or an exaggeration of her vascular condition. The surgeon argues that if she were three months pregnant or less he would terminate the gestation, but since she has progressed to four and one-half months he feels that termination would be as dangerous as letting her go on to eight months. Please give me your opinion.

M.D., Ohio.

ANSWER.—In all probability the patient has an essential hypertension of the malignant type. The cerebral accident at the early age of 29 would indicate such a diagnosis. Furthermore, the absence of urinary abnormalities lends credence to this view.

It has been usually noted that patients with such severe hypertension are not likely to continue their gestation to term. One of several accidents is likely to occur. The most frequent complication is the death of the fetus in utero. Occasionally a premature separation of the placenta, abruptio placentae, supervenes in the course of the pregnancy. In the event that the patient successfully carries the baby to term or near term, the fetus is likely to be small, underdeveloped and immature as a result of extensive infarction of the placenta. For these reasons the early interruption of pregnancy is usually considered the safest procedure.

In this case the decision as to when to terminate the gestation will probably not affect the prognosis for the mother and child appreciably. In any event, it is unlikely that a living child will result. The artificial interruption of pregnancy at this time is usually difficult, and operative manipulations carry considerable risk in such cases. It is doubtful whether the artificial termination at or near term will increase the hazard. The likelihood of permanent kidney damage is not an important factor to this seriously ill patient. The hypertension, however, will probably become more severe. Another and perhaps fatal cerebral accident may occur at any time. The patient should be watched carefully and in the event that fetal death occurs a spontaneous evacuation of the uterus may take place. This should offer the best prognosis for the patient.

REACTIONS AFTER TETANUS ANTITOXIN

To the Editor:—A cattle ranchman, aged 24, was using a pocket knife to trim a horse's tail; he dropped the knife, which stuck deeply into the calf of the leg, making it bleed profusely. This was June 10. A doctor gave him tetanus antitoxin (probably 1,500 units) into the outer upper left arm. He didn't scrub the arm with a brush and soap and water but used only an alcohol swab. During the night of June 10 the patient's arm began swelling and itching; it became swollen to the finger tips and brawny and red. The next day at noon the pulse rate was 104, the temperature 101 F. The eyes were red. The head ached. The neck was slightly stiff. There was paralysis of the left arm. The shoulder was painful and lame. The right arm was swollen and he had severe backache and pain in both knees and calves of the legs. There were anorexia, restlessness and sleeplessness. The treatment was hot water baths including the shoulder and entire arm alternating with cold. Ten cc. of metaphen was injected intravenously with magnesium sulfate by mouth. Two dozen tablets of sulfanilamide were given, three tablets three times a day. Sedatives were administered for rest. Forced fluids and a nourishing liquid diet (beef broth, oyster soup) were prescribed. There was an improvement overnight, the temperature decreased and the swelling and redness of the arm disappeared; but the calves of the legs and knees "feel drawn" and the patient walks "string haltered," raising the knees high at each step. That is the only remaining infirmity. What causes it? Could the tetanus antitoxin have been old or polluted? I don't know what brand was used or how fresh it was. Should I give him more? Are the "lame legs" beginning tetanus or the result of a beginning general septicemia affecting the knee joints and calves? Shall I take a watchful expectancy attitude or give him more metaphen and fresh antitoxin? An outline of treatment with diagnosis of his gait would be appreciated. The punctured wound in the limb is healing and there is no pus or any drainage. The wound was not swabbed out, as it was bleeding so much and was only the size of a small knife blade. He is afraid of any more needle punctures and of tetanus antitoxin.

M.D., Colorado.

ANSWER.—This patient probably suffered an early serum reaction. Serum sickness as a rule is much later in appearing than in this case but if the patient is congenitally sensitive to serum or if serum has been administered previously, the symptoms may come on with almost the rapidity of anaphylactic shock. It is not necessary for the serum to be old or contaminated to produce such a reaction. All the symptoms described, with the exception of the gait, are commonly seen in serum sickness. Transient neurologic phenomena, which would account for the peculiar gait, have been infrequently described in this country but have been rather frequently mentioned in the French literature.

It is difficult to explain the lame legs as a phenomenon of tetanus. They were present the day after the accident. Tetanus as the result of a wound of the leg in an adult is extremely unlikely to appear in less than a week. Tetanus in any case earlier than three days is a great rarity. A beginning general septicemia seems equally unlikely. Such an event should be accompanied by more severe general symptoms. It is altogether likely that the residual symptoms will gradually disappear without treatment.

More antiserum would be likely to produce a reaction even more serious than the initial one. Fatal collapse has followed such procedures. In the World War tetanus was nearly abolished by the use of a single prophylactic injection of antiserum. Tetanus is rather uncommon in persons who are constantly exposed to the organism. These facts would make the appearance of tetanus in this patient a rather remote possibility. In spite of this feeling of relative safety, the patient should be watched for several weeks. If frank symptoms of tetanus appear he should be vigorously treated, but he must be desensitized before any quantity of serum is administered.

ALKALOSIS

To the Editor:—Please give the physiologicochemical reactions that occur when one gives (1) saline solution, (2) Ringer's solution and (3) Hartmann's solution in (*a*) alkalosis and (*b*) acidosis.

M.D., Tennessee.

ANSWER.—Alkalosis designates an increase in the bicarbonates (alkali reserve) of the blood above the normal level, as from ingestion or administration of alkalis to the extent that elimination by the kidney or bowel is not sufficient to prevent accumulation in the blood, or represents an abnormal increase in the p_H of the blood, as from overventilation (excess breathing) leading to excess loss of carbon dioxide from the blood with the resulting reduction of carbonic acid in proportion to bicarbonate (uncompensated gaseous alkalosis). Treatment of alkalosis, varying with the condition which produced it, is directed toward the correction of the disturbed acid-base balance and dehydration. If the condition is due to excessive alkali ingestion, the alkali should be discontinued and saline solution should be forced by mouth to enable excretion of the excess alkali. Physiologic solution of sodium chloride in large amounts will help to restore the normal electrolyte pattern in the blood. Alkalosis produced by vomiting, in which severe chloride loss and dehydration occur, should be treated by intravenous injection of large amounts of saline solution (1,000 cc. of 1 per cent sodium chloride every three hours). Alkalosis due to overventilation (acapnial alkalosis) may be relieved by rebreathing a 5 per cent carbon dioxide-oxygen mixture.

Acidosis is the term applied to the diminution to a subnormal level of the reserve supply of fixed bases in the blood but has been loosely used to indicate also a decrease in the p_H of the blood. Only severe acidosis is of clinical importance, as in diabetes mellitus, in the terminal stages of chronic nephritis, in Asiatic cholera and in shock, burns, poisoning and fasting. Acidosis is most commonly caused by diabetes in which there is excessive production of beta-hydroxybutyric and acetoacetic acids from deranged fat and protein metabolism (the condition for which Naunyn originally introduced the term acidosis). In almost all cases of acidosis there is dehydration and loss of base, and treatment consists in rapidly restoring the water balance and acid-base equilibrium to normal by administration of large amounts of a solution which supplies base and water, thus increasing the blood volume, blood pressure, plasma carbon dioxide and urinary output, alleviating coma and offsetting the danger of shock. In mild acidosis the patient is not in coma; sodium bicarbonate is therefore not necessary and considerably less solution is required for restoration of the normal water and base balance.

It may be noted from the foregoing that sodium chloride solution (1 per cent), Ringer's solution (0.65 per cent sodium chloride, 0.030 per cent potassium chloride, 0.025 per cent calcium chloride, 0.020 per cent sodium bicarbonate and 0.001 per cent sodium biphosphate) and Hartmann's solution (lactate-Ringer's solution; 0.20 per cent lactic acid as sodium lactate, 0.6 per cent sodium chloride, 0.04 per cent potassium chloride and 0.02 per cent calcium chloride) all have their places in the treatment of alkalosis or acidosis. Sodium chloride solution overcomes the dehydration and salt depletion; Ringer's solution, in addition to overcoming water and salt depletion, supplies bicarbonate; lactate-Ringer's solution supplies water, base chloride, base bicarbonate and antiketogenic effect. Sodium chloride solution in alkalosis and mild acidosis and Ringer's solution in severe acidosis are the fluids of choice. Lactate-Ringer's solution may be used for the treatment of dehydration with a moderate degree of acidosis or alkalosis.

SODIUM THIOSULFATE IN ARSENIC POISONING AND RAYNAUD'S PHENOMENON

To the Editor:—I would appreciate information as to the treatment of Raynaud's disease and arsenic poisoning with sodium thiosulfate.

R. O. WHARTON, M.D., Gary, Ind.

ANSWER.—Diametrically opposed opinions have been held by various authors relative to the efficacy of the administration of sodium thiosulfate in the treatment of poisoning with arsenic. The subject has been reviewed by Ayres and Anderson (THE JOURNAL, March 19, 1938, p. 886), who have made determinations for arsenic on the urine of forty-nine patients with a variety of cutaneous disorders for which arsenic was suspected as being a possible etiologic factor. Of these patients 8 per cent did not have arsenic in the urine either before or after injection of sodium thiosulfate. The urine of 12 per cent showed less arsenic after than before injection of sodium thiosulfate, and the urine of 80 per cent showed an increase of arsenic after injection of sodium thiosulfate. These authors consider it unequivocally proved that an increase in the excretion of urinary arsenic usually follows the injection of sodium thiosulfate. Most students of the subject agree that in arsenism the use of sodium thiosulfate is of value but clinical experience indicates that it is most efficacious in treating the acute manifestations of arsenic poisoning.

The inquirer's question intimates that there is a relationship between arsenic poisoning and Raynaud's phenomenon. That such a relationship exists has been contended by Kraetzer (*New York State J. Med.* **35**:1130 [Nov. 15] 1935). He treated seven patients with Raynaud's phenomenon, the urine of all of whom contained arsenic after treatment with sodium thiosulfate. In all instances Raynaud's phenomenon disappeared entirely or was greatly improved after treatment over varying periods with sodium thiosulfate. Another investigator studied the urine of eight patients following the intravenous injection of sodium thiosulfate and was unable to demonstrate significant amounts of arsenic in the urine of any of them. Kraetzer feels that lead may occasionally be the etiologic basis for Raynaud's disease, but another investigator who has treated more than 500 cases of carcinoma with lead has noted that none of the patients so treated had manifestations of Raynaud's disease. The subject

is far from settled but it seems desirable to try the effect of intravenous administration of sodium thiosulfate on the Raynaud phenomenon. The drug should be given intravenously twice a week in doses of 0.5 Gm. The solution should be made up fresh from highly purified crystals.

APPENDICITIS AND DISEASE OF LUNG

To the Editor:—During the last four years I have operated in four cases of gangrenous appendix. In each case I was hesitant about operating because of rales in the base of the right lung posteriorly. The rales were of the fine crepitant type; being in doubt as to whether I was dealing with pneumonia or appendicitis, I was always hesitant to operate until signs became definite. In the last case an embolism occurred in the base of the right lung posteriorly two days after operation. It was a large occlusion involving about half of the lung. Is there any connection between a gangrenous appendix and the right side of the chest? Is there any weakness which would cause the right lung to become involved after an operation of this sort? All these operations were done under spinal anesthesia and all the appendixes were definitely gangrenous.

L. C. POMAINVILLE, M.D., Wisconsin Rapids, Wis.

ANSWER.—There is no known direct connection between appendicitis and pathologic conditions in the right chest. The fact that the appendix was gangrenous does not alter the connection. Rarely a subphrenic abscess will occur after a ruptured appendix and will secondarily involve the pleura above the diaphragm. In the case described as an embolism in the base of the right lung posteriorly it is not impossible that this was rather an atelectasis or partial collapse occurring as a result of a mucous plug in the bronchus. Atelectasis may occur with spinal anesthesia and is not really infrequent. The best prophylaxis against massive collapse (atelectasis) is the avoidance of undue preliminary medication. In some places morphine has been abandoned entirely. Differential diagnosis between pneumonia and appendicitis is usually not difficult except in young children. In adults, in cases of pneumonia, the entire right rectus is usually rigid, which is less frequently the case in appendicitis. In addition, of course, there are abnormalities of the lung observed through auscultation, increased respiratory rate, and possibly a cough.

RECURRENT CORNEAL ULCERS

To the Editor:—A woman, aged 63, has had recurrent corneal ulcers in each eye; about five in one year. For the last two months I have given her ABD capsules twice a day but this week she has had a recurrence. The urine and blood are normal in all respects. The blood pressure is normal. She is 5 feet 3 inches (160 cm.) tall and weighs 130 pounds (59 Kg.). She had been well until two years ago, when she began to have pain in the upper left quadrant and lost 30 pounds (13.6 Kg.) because certain food distressed her. A complete gastrointestinal examination was made and the last part of the transverse and the first part of descending colon were found to overlap each other entirely. Stomach analysis gave negative results. She was given a low residue diet and she has gained 10 pounds (4.5 Kg.) and has little pain in the abdomen. Is it possible that this intestinal condition has anything to do with the frequent corneal ulcers? Would there be any way to prevent these recurrences or anything further to look for as the cause of this condition?

LOUIS S. BOEH, M.D., Conway, Mass.

ANSWER.—If the recurrent ulcers are of the usual catarrhal type they may be caused by an accompanying conjunctivitis. The use of 0.2 per cent zinc chloride solution three times a day may clear up the conjunctivitis and prevent recurrences. Larger doses of vitamin A may also be of benefit, twenty drops of halibut liver oil or sixty drops of carotene a day being probably sufficient. Blepharitis, if present, should be treated. The intestinal condition may be an indirect factor by lowering the general nutrition.

INTOXICATION OR CEREBRAL CONCUSSION

To the Editor:—How often does cerebral concussion simulate intoxication? I am interested in knowing how often patients held for intoxication are later found to be suffering from cerebral concussion.

M.D., Wisconsin.

ANSWER.—Simple cerebral concussion rarely if ever simulates intoxication. When it does occur it should be relatively easy to differentiate between them. In simple concussion of the brain without fracture or compression there is usually some disturbance of consciousness ranging from momentary "seeing stars" to temporary unconsciousness. Severe or prolonged stupor or deep coma is not characteristic of simple concussion. These conditions indicate much more grave brain damage or injury. In intoxication the breath has the characteristic odor, the stomach content has alcohol in it and the blood stream is positive for alcohol. There are usually multiple and variable neurologic signs of alcoholism. These are tremulous hands, positive Quinquaud's sign, tremulous speech, tremulous tongue, rapid pulse and a varied type of mental and emotional behavior ranging from violence and garrulousness to an ordinary depressed or sleepy state. Many cases of concussion of the brain result from the indiscreet use of alcohol and an automobile. In a large hospital of 3,300 beds there is an average daily admission of about ten cases of acute alcoholism with lacerations of the scalp. These patients are observed for forty-eight hours for development of complications or objective evidence of organic disease. If none occur at the end of this time they are sent home with the advice to return for a second examination in one week. It is a rare occurrence to have a person held in a police station for intoxication when that person is suffering a cerebral concussion. Severe craniocerebral injuries in association with alcohol must be treated and observed for a period from fourteen to twenty-one days, depending on the extent of craniocerebral damage.

SODIUM TETRATHIONATE IN CARBON MONOXIDE POISONING

To the Editor:—In August 1933 a report was published in the local newspaper referring to the chemical "Sodium Tetra-Thionate," which was used as a specific therapeutic agent in carbon monoxide poisoning. I have never seen any reports published in the literature and no further mention has been made of this agent. Since I have a supply of this substance and since I have a fair number of these cases, I would appreciate any information you can supply as to use, mode of administration, action and dosage of this drug.

M.D., New Jersey.

ANSWER.—No reports on this subject have been discovered in scientific or medical literature. There is no general reason to suppose that so mild an oxidizing agent as sodium tetrathionate would be of any value in carbon monoxide poisoning. Its effect, like that of methylene blue, might tend to produce methemoglobin and thus exacerbate the ill effects of carbon monoxide.

MALIGNANT HYPERTENSION AND TERMINATION OF PREGNANCY

To the Editor:—A white woman, aged 29, four and one-half months pregnant, has an atrophied and functionless left arm and drags the foot when she walks. This followed a hemorrhage into the internal capsule in August 1937. The blood pressure was 230 systolic, 140 diastolic. The urine was normal. In spite of the fact that she was extremely desirous of having a child, even at the expense of her own life, I demanded the termination of the pregnancy and she reluctantly consented. She was admitted to a hospital in a neighboring town, but after the consulting surgeon examined her he thought best to watch her carefully until seven and one-half to 8 months and then do a cesarean section. If she developed signs of increasing toxemia, he maintained that the abortion at that time would be attended by no more danger than if it was done now. I myself feel that if this woman is allowed to continue her pregnancy to eight months she will certainly have a permanently damaged kidney function or an exaggeration of her vascular condition. The surgeon argues that if she were three months pregnant or less he would terminate the gestation, but since she has progressed to four and one-half months he feels that termination would be as dangerous as letting her go on to eight months. Please give me your opinion.

M.D., Ohio.

ANSWER.—In all probability the patient has an essential hypertension of the malignant type. The cerebral accident at the early age of 29 would indicate such a diagnosis. Furthermore, the absence of urinary abnormalities lends credence to this view.

It has been usually noted that patients with such severe hypertension are not likely to continue their gestation to term. One of several accidents is likely to occur. The most frequent complication is the death of the fetus in utero. Occasionally a premature separation of the placenta, abruptio placentae, supervenes in the course of the pregnancy. In the event that the patient successfully carries the baby to term or near term, the fetus is likely to be small, underdeveloped and immature as a result of extensive infarction of the placenta. For these reasons the early interruption of pregnancy is usually considered the safest procedure.

In this case the decision as to when to terminate the gestation will probably not affect the prognosis for the mother and child appreciably. In any event, it is unlikely that a living child will result. The artificial interruption of pregnancy at this time is usually difficult, and operative manipulations carry considerable risk in such cases. It is doubtful whether the artificial termination at or near term will increase the hazard. The likelihood of permanent kidney damage is not an important factor to this seriously ill patient. The hypertension, however, will probably become more severe. Another and perhaps fatal cerebral accident may occur at any time. The patient should be watched carefully and in the event that fetal death occurs a spontaneous evacuation of the uterus may take place. This should offer the best prognosis for the patient.

EFFECT OF OVARIES ON PITUITARY FUNCTION

To the Editor:—Is there any evidence that the ovaries have an inhibitory action on pituitary functioning? A woman, aged 47, received high voltage roentgen therapy (irradiation over the pelvic region) five years ago, to bring about a cessation of menstruation. Her menstruation had been prolonged and excessive for several years previously. Shortly after the roentgen exposure she began to show signs of what has now developed into a well established case of acromegaly. Could there be any connection between the roentgen therapy and the development of the disease? Would high voltage roentgen therapy of the pituitary be advisable at this time?

M.D., Ohio.

ANSWER.—The ovaries exercise an inhibitory action on pituitary function. This is demonstrated not infrequently when ovarian function ceases. Even in the normal menopause there is unquestionably a temporary increase in pituitary function. This is more marked in the induced menopause, whether brought about by surgery or by irradiation. This also is usually temporary in nature.

In the case cited it is possible that the irradiation over the pelvic region which brought about the cessation of menstruation just constituted the last straw which is responsible for precipitating the acromegaly. If this was the case there must have been a preexisting tendency to hyperfunction of the pituitary which became exaggerated with the induced menopause. The extent of the acromegaly will probably be the determining factor as to whether or not roentgen therapy at the present time is advisable. If so advanced as to give rise to intractable headache or visual disturbances, the irradiation would probably prove futile. If in a milder form, roentgen therapy is justifiable and might prove beneficial.

COMPLICATED CATARACT

To the Editor:—A man, aged 48, was referred to me to have a cataract removed. Adhesions between the iris and the anterior capsule of the lens are so adherent that it is impossible to dilate the pupil. The patient has become neurotic since the accident to his eye and thinks that if the cataract is removed he will become normal again. Would you think it justified to attempt to do a cataract extraction on this patient?

M.D., Michigan.

ANSWER.—There are so many points involved in dealing with a question of this kind that generalization is extremely difficult. In the first place what was the cause of the cataract and consequently what are the chances of useful vision provided a successful extraction is performed? In the second place, this is evidently a cataracta complicata and the chances for successful operation are somewhat poorer in this form. It might be mentioned that extraction of the lens through a round pupil is highly desirable in a neurotic person of 48 but seems hardly possible in the case as described. In the third place, the mental aspect of the patient seems to be none too favorable for the considerable tension and anxiety that the operation induces. Finally, the patient must be disabused promptly of the idea that subsequent to the extraction he will have an eye that will function as normally as before. When all this has been explained to the patient so that he can know what he has to look forward to, the operation may be undertaken if still desired. The mere presence of posterior adhesions does not preclude the likelihood of a successful extraction.

PARALDEHYDE AND ANALGESICS IN LABOR

To the Editor:—Is it safe to give paraldehyde orally in obstetrics? I notice that it is being used in 4 and 5 drachm doses with the same amount of aromatic elixir to produce obstetric amnesia. Would you please discuss the use of it?

M.D., West Virginia.

ANSWER.—A patient of average weight can be given 15 cc. (4 or 5 drachms) of paraldehyde orally without endangering life. This dose will produce considerable obstetric amnesia. As a rule, paraldehyde is combined with some other drug to provide more adequate relief from pain. Its administration in benzyl alcohol by rectum has been suggested (Kane, H. F., and Roth, G. B.: The Relief of Labor Pains by the Use of Paraldehyde and Benzyl Alcohol, THE JOURNAL, Nov. 21, 1936, p. 1710).

The problem of providing relief from pain in childbirth is difficult. A large number of sedative and analgesic drugs have been suggested. The most common are morphine, with or without scopolamine, the barbiturates and paraldehyde. No one drug is ideal, for a drug thus used must be safe not only for the mother but also for the baby and should have no effect on the progress of labor. Most of these drugs, when given in sufficient amounts to produce analgesia and/or amnesia, delay labor and cause fetal asphyxia. This interference with the normal process of labor often results in operative intervention, with increased hazards to mother and baby. The fetal asphyxia necessitates methods of resuscitation with increased fetal mortality. The use of paraldehyde has the same disadvantages.

URINARY INFECTION WITH STAPHYLOCOCCUS ALBUS

To the Editor:—A patient has a Staphylococcus albus urinary infection. She complains of frequency and a feeling of pressure over the bladder when she has to urinate. What antiseptic would you advise?

FREDERICK B. DEVITT, M.D., Oneonta, N. Y.

ANSWER.—In treating patients with Staphylococcus albus infection of the urinary tract, intravenous neoarsphenamine and the instillation of 30 cc. of 5 per cent mild protein silver in the bladder has been most helpful. Frequently there is an accompanying cicatricial urethritis in association with these cases, and dilation of the urethra plus the application of 5 per cent strong protein silver tampons to the uretinra will often be worth while. It would also be helpful to eradicate any existing foci of infection.

WEANING

To the Editor:—What is considered the proper time and method to begin weaning a normal breast-fed baby? Both baby and mother are normal in every way and the supply of lactation is adequate. The baby is receiving the usual amounts of cod liver oil, orange juice, cereal, egg yolk and vegetables, at 6 months of age.

M.D., Illinois.

ANSWER.—The time for weaning a normal breast-fed baby varies with the condition of the baby and the mother. Usually weaning can commence at about the sixth or seventh month in a healthy baby of good weight. By this time the supplementary foods such as fruits and vegetables have probably been started and dentition should be well under way. The method for weaning should be gradual, one nursing at the breast being supplemented by a bottle feeding daily at the start. Then, after from ten days to two weeks, two daily bottle feedings may be substituted. After another interval three bottle feedings and two nursings are allowed. With such a gradual procedure in weaning, the milk supply in the mother's breast is slowly diminished so that by the time the infant is entirely weaned the mother should experience no difficulty in drying up the remainder of her milk supply.

ENNJAY SOLVENT NO. 2

To the Editor:—I should like information as to the toxicity of the metal cleaner known as Ennjay Solvent No. 2, made by the William J. Hough Company, Chicago. From an industrial point of view would it be considered as toxic as or more toxic to exposed workers than xylene?

M.D., Indiana.

ANSWER.—The William J. Hough Company market a metal cleaner under the designation of Ennjay Solvent No. 2, which, however, is believed to be manufactured by the Standard Oil Company of New Jersey. Without actual analysis, it appears that this cleaner's chief component is petroleum naphtha, of a grade akin to Stoddard's solvent. Tests were made for a chlorinated hydrocarbon content and no evidence of such was found. It appears that this cleaner may contain a low percentage of some coal tar derivative, possibly toluene or xylene. This, however, has not been demonstrated. On these assumptions, this cleaner may be regarded as less toxic than toluene under conditions providing equal exposure to the vapors of these individual substances. However, it is to be recognized that the vapors of petroleum naphtha are not entirely innocuous and on occasion have produced both acute and chronic episodes. More nearly exact data possibly may be obtained from the Standard Oil Company of New Jersey and certainly from fractional distillation, should circumstances warrant.

ROENTGEN THERAPY OF PITUITARY FOR MENORRHAGIA

To the Editor:—What is the present status of roentgen therapy over the pituitary gland as treatment for menorrhagia for which there is no demonstrable local cause? Are there any bad after-effects?

M.D., Alabama.

ANSWER.—Irradiation of the pituitary gland with roentgen rays is usually employed in cases of menopausal disturbances and amenorrhea rather than for menorrhagia. In the hands of experienced roentgenologists practically no apparent harm has resulted from this form of therapy. However, in some young women an undesired permanent amenorrhea has followed such treatment. Of course during the menopause such a result is of no significance. Great caution must be exercised in the use of

roentgen treatment of the pituitary for any purpose, especially by roentgenologists not familiar with this form of therapy. In most cases of menorrhagia during the menopause, radium applied within the uterus or roentgen treatment over the uterus is safer than irradiation of the hypophysis. In young women conservative measures, including rest in bed, oxytocics, thyroid and sometimes other endocrine products, will usually suffice until normal conditions are restored. Of course in every case of severe and prolonged menorrhagia, especially at the change of life, a careful curettement should be performed to rule out the presence of carcinoma.

ETIOLOGY OF KALA-AZAR AND GRANULOMA INGUINALE

To the Editor:—What is the relationship between the etiologic agent of kala-azar, Leishmania donovani, and the so-called Donovan body, frequently described as the specific organism of granuloma inguinale? Are they both animal parasites? Some authorities refer to one as a protozoan, the other as a bacillus. What is regarded at present as the causative agent in granuloma inguinale?

IRVING M. CLYNE, M.D., Far Rockaway, N. Y.

ANSWER.—Leishmania donovani, of which the Leishman-Donovan body of kala-azar is the typical vertebrate phase, belongs to the hemoflagellates, which are classified by protozoologists as animal flagellates. There seems fair agreement that the Donovan body described in granuloma inguinale is not related to the Leishmanias and is probably not an animal organism, but there is considerable difference of opinion as to its exact nature. Many investigators believe that it is an encapsulated gram-negative bacillus (B. granuloma or Klebsiella granulomatis) related to Friedländer's bacillus. This, however, has not been definitely established and the recent work of Dienst, Greenblatt and Sanderson (*J. Infect. Dis.* **63**:112, 1938) indicates that although the Donovan bodies are the etiologic agent of granuloma inguinale they are not related to the Friedländer type of bacilli since they were able to produce a typical lesion in a healthy volunteer by artificial inoculation with an exudate rich in Donovan bodies and free from culturable bacteria.

STERILIZING RUBBER GLOVES

To the Editor:—Please outline a practical method of sterilizing rubber gloves and packing them so that they will be sterile when used. I want information on a method that can be used by one who is practicing general medicine and doing obstetric work where an autoclave is not available.

M.D., Pennsylvania.

ANSWER.—In the absence of facilities for steam sterilization, the following procedure for the sterilization of rubber gloves is suggested:

Insert into the hand of the glove a pack of gauze or other porous material about one-fourth inch thick to hold the rubber surfaces apart. This pad should be inserted as far as the base of the fingers of the glove. Immerse the gloves in a pan of water and boil for at least thirty minutes. After boiling, remove the gloves, dry them with a sterile towel under aseptic technic and then fold them into a sterile towel until needed. Gloves sterilized in this fashion can be put on by immersing in sterile water and drawn on the submerged hand if sterile talcum is not available.

CALLAHAN TUBES IN DACRYOCYSTITIS

To the Editor:—In the *American Journal of Ophthalmology* (**19**:601 [July] 1936) there is an article on the use of the Callahan tubes in chronic dacryocystitis. I should like to know the real scientific nature of this kind of treatment.

GUILLERMO ARAOS FRASER, M.D., Colombia, South America.

ANSWER.—The article referred to was written by Dr. C. N. Spratt, ophthalmologist of Minneapolis, and recorded the relief obtained in sixty-two of sixty-five cases of dacryostenosis by the use of the Callahan tubes. These are thin silver tubes that are introduced into the lacrimal passage and are open at both the upper and the lower end, the latter of which is located in the nose directly under the turbinate. The theory underlying the use of the Callahan tubes is perfectly sound, the purpose being to drain tears through a passage the patency of which is maintained by a foreign tube not subject to scar tissue constriction. The physiology of normal tear drainage is altered by the elimination of the pump action of the sac and of the effect of the ciliated epithelium. Therefore, only gravity remains. Practical objections to the use of the tubes may arise after more clinical experiences have been recorded, but at present the tubes would seem to offer a favorable solution to an intractable problem.

Medical Examinations and Licensure

COMING EXAMINATIONS

STATE AND TERRITORIAL BOARDS

ALABAMA: Montgomery, June 20-22. Sec., Dr. J. N. Baker, 517 Dexter Ave., Montgomery.

ALASKA: Juneau, Sept. 6. Sec., Dr. W. W. Council, Box 561, Juneau.

ARIZONA: *Basic Science.* Tucson, Sept. 20. Sec., Dr. Robert L. Nugent, Science Hall, University of Arizona, Tucson.

ARKANSAS: *Medical (Regular).* Little Rock, Nov. 3-4. Sec., State Medical Board of the Arkansas Medical Society, Dr. L. J. Kosminsky, Texarkana. *Medical (Eclectic).* Little Rock, Nov. 3. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock. *Basic Science.* Little Rock, Nov. 7. Sec., Mr. Louis E. Gebauer, 701 Main St., Little Rock.

CALIFORNIA: *Reciprocity.* San Francisco, Sept. 14, and Los Angeles, Nov. 16. *Written examination.* Sacramento, Oct. 17-20. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

COLORADO: Denver, Oct. 5-7. Sec., Dr. Harvey W. Snyder, 831 Republic Bldg., Denver.

CONNECTICUT: *Basic Science.* New Haven, Oct. 8. *Prerequisite to license examination.* Address State Board of Healing Arts, 1895 Yale Station, New Haven. *Medical (Regular).* Hartford, Nov. 8-9. Sec., Dr. Thomas P. Murdock, 147 W. Main St., Meriden. *Medical (Homeopathic).* Derby, Nov. 8-9. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: Dover, July 11-13. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

DISTRICT OF COLUMBIA: *Basic Science.* Washington, Dec. 26-27. *Medical.* Washington, Jan. 9-10. Sec., Commission on Licensure, Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: Jacksonville, Nov. 14-15. Sec., Dr. William M. Rowlett, Box 786, Tampa.

GEORGIA: Atlanta, Oct. 11-12. Joint Sec., State Examining Boards, Mr. R. C. Coleman, 111 State Capitol, Atlanta.

IDAHO: Boise, Oct. 4-5. Commissioner of Law Enforcement, Hon. J. L. Balderston, 205 State House, Boise.

ILLINOIS: Chicago, Oct. 18-20. Superintendent of Registration, Department of Registration and Education, Mr. Homer J. Byrd, Springfield.

IOWA: *Basic Science.* Des Moines, Oct. 11. Corres. Sec., Mr. H. W. Grefe, Capitol Bldg., Des Moines.

MAINE: Portland, Nov. 8-9. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Medical (Regular).* Baltimore, Dec. 13-16. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Medical (Homeopathic).* Baltimore, Dec. 13-14. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, Nov. 8-10. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413-F State House, Boston.

MICHIGAN: Lansing, Oct. 12-14. Sec., Board of Registration in Medicine, Dr. J. Earl McIntyre, 202-3-4 Hollister Bldg., Lansing.

MINNESOTA: *Basic Science.* Minneapolis, Oct. 4-5. Sec., Dr. J. Charnley McKinley, 126 Millard Hall, University of Minnesota, Minneapolis. *Medical.* Minneapolis, Oct. 18-20. Sec., Dr. Julian F. Du Bois, 350 St. Peter St., St. Paul.

MISSISSIPPI: *Reciprocity.* Jackson, December. Asst. Sec., State Board of Health, Dr. R. W. Whitfield, Jackson.

MONTANA: Helena, Oct. 4. Sec., Dr. S. A. Cooney, 216 Power Block, Helena.

NEBRASKA: *Basic Science.* Lincoln, Oct. 4-5. Dir., Bureau of Examining Boards, Mrs. Clark Perkins, State House, Lincoln.

NEW HAMPSHIRE: Concord, Sept. 15-16. Sec., Board of Registration in Medicine, Dr. Fred E. Clow, State House, Concord.

NEW JERSEY: Trenton, Oct. 18-19. Sec., Dr. James J. McGuire, 28 W. State St., Trenton.

NEW MEXICO: Santa Fe, Oct. 10-11. Sec., Dr. Le Grand Ward, 135 Palace Ave., Santa Fe.

NEW YORK: Albany, Buffalo, New York, and Syracuse, Sept. 19-22. Chief, Bureau of Professional Examinations, Mr. Herbert J. Hamilton, 315 Education Bldg., Albany.

NORTH CAROLINA: *Reciprocity.* December. Sec., Dr. William D. James, The Hamlet Hospital, Hamlet.

NORTH DAKOTA: Grand Forks, Jan. 3-6. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OKLAHOMA: *Basic Science.* Oklahoma City, Nov. 30. Sec. of State, Hon. Frank C. Carter, State Capitol Bldg., Oklahoma City. *Medical.* Oklahoma City, Dec. 14. Sec., Dr. James Osborn Jr., Frederick.

OREGON: *Basic Science.* Portland, Nov. 19. Sec., State Board of Higher Education, Mr. Charles D. Byrne, University of Oregon, Eugene.

PENNSYLVANIA: Philadelphia, January. Sec., Board of Medical Education and Licensure, Dr. James A. Newpher, 400 Education Bldg., Harrisburg.

PUERTO RICO: Santurce, Sept. 6-10. Sec., Dr. O. Costa Mandry, Box 3854, Santurce.

SOUTH CAROLINA: Columbia, Nov. 8. Sec., Dr. A. Earle Boozer, 505 Saluda Ave., Columbia.

SOUTH DAKOTA: Pierre, Jan. 17-18. Director of Medical Licensure, Dr. B. A. Dyar, State Board of Health, Pierre.

VERMONT: Burlington, Feb. 14. Sec., Board of Medical Registration, Dr. W. Scott Nay, Underhill.

VIRGINIA: Richmond, Dec. 14-16. Sec., Dr. J. W. Preston, 301½ Franklin Road, Roanoke.

WEST VIRGINIA: Bluefield, Oct. 31-Nov. 2. Sec., Public Health Council, Dr. Arthur E. McClue, State Capitol, Charleston.

WISCONSIN: *Basic Science.* Madison, Sept. 24. Sec., Prof. Robert N. Baer, 3414 W. Wisconsin Ave., Milwaukee. *Medical.* Madison, Jan. 10-14. Sec., Dr. Henry J. Gramling, 2203 S. Layton Blvd., Milwaukee.

WYOMING: Cheyenne, Oct. 3 (probable date). Sec., Dr. G. M. Anderson, Capitol Bldg., Cheyenne.

NATIONAL BOARD OF MEDICAL EXAMINERS SPECIAL BOARDS

Examinations of the *National Board of Medical Examiners* and *Special Boards* were published in THE JOURNAL, August 13, page 647.

Arkansas June Examination

Dr. L. J. Kosminsky, secretary, State Medical Board of the Arkansas Medical Society, reports the written examination held at Little Rock, June 9-10, 1938. The examination covered twelve subjects. An average of 75 per cent was required to pass. Seventy-one candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
University of Arkansas School of Medicine		(1937) (1938)	85.3, 79.2, 79.8, 80.1, 80.3, 80.5, 80.8, 81.1, 81.9, 82.1, 82.3, 82.4, 82.4, 82.4, 82.8, 82.8, 82.9, 83.1, 83.1, 83.2, 83.3, 83.3, 83.4, 83.5, 83.8, 83.8, 83.8, 84, 84.1, 84.1, 84.3, 84.3, 84.3, 84.4, 84.5, 84.7, 84.8, 84.8, 84.8, 85, 85, 85.1, 85.2, 85.3, 85.3, 85.4, 85.7, 85.8, 85.8, 85.8, 85.8, 85.8, 86.1, 86.3, 86.3, 86.8, 87.1, 87.3, 87.3, 87.8, 88.4, 89.1, 89.2, 89.3, 90, 90.3, 91.3, 91.9
College of Physicians and Surgeons, Boston		(1937)	87
Columbia University College of Physicians and Surgeons		(1935)	86.3

Ten physicians were licensed by reciprocity from January 12 through June 11. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Colorado School of Medicine		(1932), (1936)	Colorado
Johns Hopkins University School of Medicine		(1937)	Maryland
Marion-Sims College of Medicine, Missouri		(1896)	Oklahoma
St. Louis University School of Medicine		(1932)	Missouri
Washington University School of Medicine		(1934)	Missouri
Jefferson Medical College of Philadelphia		(1932)	New Jersey
University of Tennessee College of Medicine		(1936, 2), (1937)	Tennessee

Maryland (Homeopathic) June Examination

Dr. John A. Evans, secretary, Board of (Homeopathic) Medical Examiners, reports the written examination held at Baltimore, June 21-22, 1938. The examination covered nine subjects and included seventy questions. An average of 75 per cent was required to pass. Thirty-one candidates were examined, thirty of whom passed and one failed. The following school was represented:

School	PASSED	Year Grad.	Per Cent
Hahnemann Medical College and Hospital Philadelphia		(1937) (1938)	80, 83, 84, 85, 86, 88, 89, 90, 90, 92, 92, 92, 92, 93, 94, 80, 82, 83, 83, 83, 84, 84, 85, 85, 86, 86, 86, 86, 87, 87

School	FAILED	Year Grad.	Per Cent
Hahnemann Medical College and Hospital of Philadelphia		(1937)	74

Michigan Indorsement Report

Dr. J. Earl McIntyre, secretary, Michigan State Board of Registration in Medicine, reports fifty-eight physicians licensed by indorsement from Jan. 3 through July 27, 1938. The following schools were represented:

School	LICENSED BY INDORSEMENT	Year Grad.	Indorsement of
University of Arkansas School of Medicine		(1935)	Arkansas
University of Colorado School of Medicine		(1933), (1937, 2)	Colorado
Emory University School of Medicine		(1934), (1937)	Georgia
Loyola University School of Medicine		(1936)	Illinois
Northwestern University Medical School		(1929) (1930), (1935), (1936)	Iowa, Illinois, Ohio
Rush Medical College		(1902)	Wisconsin, (1933) Iowa
University of Illinois College of Medicine		(1935), (1937, 2)	Illinois
State University of Iowa College of Medicine		(1929)	Iowa
University of Louisville School of Medicine		(1934), (1936)	Kentucky
Johns Hopkins University School of Medicine		(1935)	Maryland
University of Minnesota Medical School		(1914)	N. B. M. Ex.
Marion-Sims College of Medicine, Missouri		(1893)	Illinois
St. Louis University School of Medicine		(1926)	Ohio
Washington University School of Medicine		(1935), (1936)	Missouri
Creighton University School of Medicine		(1933)	Kansas
Univ. of Nebraska College of Med.		(1934), (1936), (1937, 2)	Nebraska
Cornell University Medical College		(1935)	New York
University of Buffalo School of Medicine		(1934)	New York
Ohio State Univ. College of Medicine		(1935, 2), (1936, 2)	Ohio
University of Cincinnati College of Medicine		(1924) (1934), (1936)	W. Virginia, Ohio
Western Reserve Univ. School of Medicine		(1935, 2) (1937, 3)	Ohio
University of Pennsylvania School of Medicine		(1935)	Penna.
Meharry Medical College		(1934)	Tennessee
University of Tennessee College of Medicine		(1937)	Tennessee
Vanderbilt University School of Medicine		(1912)	Texas
Baylor University College of Medicine		(1936), (1937)	Texas
University of Texas School of Medicine		(1937, 2)	Texas
Medical College of Virginia		(1937)	Virginia
Marquette University School of Medicine		(1933)	Wisconsin
University of Wisconsin Medical School		(1930)	Wisconsin
University of Toronto Faculty of Medicine		(1936)	Indiana
Schlesische-Friedrich-Wilhelms-Universität Medizinische Fakultät, Breslau		(1927)	Illinois

Book Notices

Malaria in Europe: An Ecological Study. By L. W. Hackett, M.D., Dr.P.H., Assistant Director, International Health Division, Rockefeller Foundation. University of London, Heath Clark Lectures, 1934, Delivered at the London School of Hygiene and Tropical Medicine. Cloth. Price, $3.75. Pp. 336, with 60 illustrations. New York & London: Oxford University Press, 1937.

This book is based on the Heath Clark lectures given at the London School of Tropical Medicine in 1934. It is the outgrowth of the work of the Malaria Experiment Station at Rome, now the Laboratory of Malaria Studies under the direction of Professor Missiroli of the new Italian Institute of Public Health. The author is assistant director of the International Health Division of the Rockefeller Foundation, which founded the Malaria Station in Rome in 1925 and carried on investigations on malaria in the Roman Campagna and at other centers in Greece, Bulgaria and Spain. Cooperation with other malariologists, especially Professor Martini at Hamburg and Professor Swellengrebel at Amsterdam, was utilized in the solution of problems of malaria and anophelism in the countries of northern Europe where anophelism both with and without malaria presented perplexing local and seasonal problems.

As the title indicates, the book is an ecologic study involving the interrelations of three interdependent groups of organisms, man, a series of related mosquitoes, and several species of Plasmodium, and these, moreover, in relation to man's domesticated animals. In its biologic aspects it is a superb demonstration of the specificities, complexities and deviations of the mutual adaptations which arise and become diversified in connection with the establishment of parasites in civilized social man. Its consequences ramify into human history as a factor in the decline of the civilizations of Greece and Rome or into human sociology when the absentee land owners of the large farms of the Roman Campagna were charged with creating conditions favoring malaria among the peasant population. It is admitted that famine and poverty affect the clinical manifestations of malaria and that improved economic conditions mitigate them, but the most prosperous communities suffer terribly at times. Social and economic uplift are no substitute for laborious antilarval campaigns and meticulous mosquito-proofing of houses.

The solution of the perplexing problem of anophelism without malaria in many European areas was solved when it was discovered that Anopheles maculipennis, the European vector of malaria, instead of being a single species in reality included no less than six distinct types, with constant characteristics such as egg markings, sexual behavior, breeding habits and zoophilic preferences. Two of the six preferred human blood, three fed by preference on cattle, and one on both. These preferences were determined by precipitin tests on the last blood meal of thousands of mosquitoes. Most of the zoophilic mosquitoes, even when captured in houses, were found to have fed on cattle. The part that the domestic animals of man play in the complicated picture of the distribution of mosquitoes and the incidence of malaria is a very important one.

Public health measures for the reduction of malarial mosquitoes seem to have swung away from drainage made popular by the successes of the engineers in the Canal Zone and to have turned more toward dusting the breeding waters of Anopheles by airplane with paris green and especially in recent years to the introduction of the top minnow, Gambusia, which feeds on the mosquito larvae but is seriously hampered by matted vegetation and running water and has seasonal limitations. An intimate knowledge of the habits and distribution of all local mosquitoes is essential to the economical and effective use of all methods of mosquito control. Truly the path of the public health officer charged with the obligation of reducing malaria is neither wide nor straight but devious and full of pitfalls. It requires an adaptation to local circumstances and an opportunism beyond that required by any other major disease of man. This arises from the fact that the mosquito lives in two habitats, the water and the air, in which it can infest large areas and all abodes of man.

The use of quinine in the treatment of malaria has had a vogue of 300 years but there is still no uniformity as to the

mode of treatment and still less agreement as to its action and efficiency. The use of malaria in the treatment of dementia paralytica has proved that quinine does not kill sporozoites injected by the mosquito and so cannot prevent an infection. Some clinical reaction on the part of the infected host seems to be necessary to render it effective, possibly in the activation of an immune mechanism. Neither can quinine sterilize the sexual forms, at least of Plasmodium falciparum. No intensification of treatment will result in the radical cure of more than a certain percentage of infected persons. It seems even to check growing immunity in some cases.

The new synthetic atabrine and plasmochin have promise of replacing quinine. The former has none of the ill effects known as cinchonism and seems to be followed by fewer relapses but may cause mental derangement. Plasmochin in minute quantities sterilizes the sexual forms of all species of Plasmodium in the blood and therefore is of great importance in eliminating these sources of the infection of mosquitoes in the human population in malarial districts, but it has no prophylactic value and its therapeutic utility is contested.

This book cannot be reviewed adequately. It is a mine of detailed information in an immense field of recent research of great importance in the prevention and control of malaria and of medical practice in malarial regions. As a biologic document in the new and important field of animal ecology it is unsurpassed as a revelation of the intricate interrelations of organisms associated in the complex of parasitism. It is a book to be read, reread and read again as a superb piece of constructive, scientific medicine. Its greatest service to the medical profession and to the public interested in the sound progress of public health measures lies in its lucid and complete demonstration of the complicated nature of at least this one problem of public health. Its solution requires adequately trained technical personnel and their cooperation over a large area and for a long time, but its results bid fair to be of lasting value.

Introduction à la chirurgie digestive. Par E. E. Lauwers. Préface du Pr P. Duval. Paper. Price, 38 francs. Pp. 223. Paris: Masson & Cie, 1937.

This essay is one of the links in a chain of five introductions by the same author to various fields of surgery, the others being introduction to surgery of the nervous system, reconstructive, thoracic and genito-urinary surgery; it brings before the eyes of the reader the general problems of this special field by making excursions into the realms of diagnosis, therapeutics and technic. The noted surgeon Pierre Duval states in the preface that three periods may be distinguished in the surgery of the digestive tract: During the first an immediate success was the main goal of the surgeon; to attain it, more and more audacious procedures were devised. The second period was characterized by improvements in the technic for the purpose of restitution of anatomic perfection. During the present, or third period, attempts are being made to combine the anatomic with functional perfection; to accomplish this and to avoid so-called operative malady caused by anatomic mutilations, a profound knowledge of normal anatomy, normal and pathologic physiology, organic chemistry, and general and organic biology is necessary. These fundamental informations, necessary for a comprehension of the surgical pathology of the digestive tract and for judicious surgery, form the base of this work. After a brief review of embryonal development of the abdominal organs the author describes malformations of the peritoneum and intestinal canal and touches on the physiology of this region. Surgical anatomy of hernias and clinical and laboratory diagnostic methods form the subject of the following chapters. Others deal with peritonitis, traumas of the abdominal region, ileus, peptic ulcers, diverticula and other important surgical conditions of the gastrointestinal tract. The closing chapters treat of surgery of the liver, biliary tract, pancreas and spleen. With admirable erudition the author picked up the high points of physiology, surgical anatomy, diagnosis and treatment of the most important pathologic conditions; he may be congratulated on his masterful, concise presentation of the subject. The book deserves translation into English to make it more accessible to the American surgeon who does not read French.

Illness: Its Story and Some Common Symptoms. A Guide for the Layman. By S. Henning Belfrage, M.D. Cloth. Price, $1.50. Pp. 175. New York & London: Oxford University Press, 1938.

This little volume, measuring 4 by 6 inches and less than five-eighths inch in thickness exclusive of the covers, is an effort to condense too much into too little space. Four pages is devoted to a foreword, five pages to "The Attainment of Health," three pages to "The Meaning of Symptoms," eight pages to "The Causes of Disease" and eleven pages to "The Nature of Disease." Merely to list the headings and the amount of space devoted to their discussion is to expose the inadequacy of this section of the book. In part two are listed "Some Common Symptoms. Their Origin, Significance, and First-Aid Treatment." Each of these symptoms is treated in a brief paragraph which is superficial and in many instances inaccurate. While the book contains much useful information, it usually falls far short of adequate treatment, even of symptoms. Fundamentally the whole idea of giving lay persons a list of symptoms and advice as to what to do about them is unsound. Such information as that contained under the heading of "Back Ache" is distinctly false. For example, "The attack tends to pass off with rest, the application of heat to the inflamed muscle, deep massage and mild purge, and five to ten grains of aspirin repeated every four to six hours if pain is severe." The book cannot be recommended.

Probleme der Biologie. Herausgegeben von Erich Ries und Karl Wetzel. Band I: Hormone bei wirbellosen Tieren. Von Gottfried Koller, a. o. Professor der Universität Kiel z. Zt. Ordinarius für Zoologie an der Staatlichen Tung Chi-Universität in Shanghai-Woosung. Cloth. Price, 10.80 marks. Pp. 143, with 27 illustrations. Leipzig: Akademische Verlagsgesellschaft m. b. H., 1938.

This volume is well written and adequately illustrates work on the physiology of the hormones of certain invertebrate animals. The author has condensed his study of these hormones into four primary divisions. One section is devoted to a consideration of cellular hormones: those elaborated by a cell and effective within the same unicellular organism. In another section are considered hormones of aglandular tissue, wherein the heart-stimulating regulators and neural hormones are discussed. A third section is devoted to the glandular hormones, such as sex hormones, hormones regulating metamorphosis and those controlling changes of color of the integument. A concluding section of the volume covers the literature relative to the effect of mammalian hormones on certain representative animals of the invertebrate phyla. The effects of the administration of hormones of the thyroid, pituitary and adrenal glands are discussed. An extensive bibliography is appended. This volume represents a distinct contribution to knowledge of endocrinology of invertebrates but clearly is not of practical significance to the busy physician in diagnosing disarrangements in the function of the endocrine system in man.

The Measurement of Outcomes of Physical Education for College Women. By Elizabeth Graybeal, Director of Physical Education for Women, State Teachers College, Duluth, Minnesota. Paper. Price, $1. Pp. 80, with 9 illustrations. Minneapolis: University of Minnesota Press, 1937.

This is an extensive and detailed report of studies at the University of Minnesota of the outcome of physical education for women. An effort is made to express gain or loss in attitudes, knowledge, motor ability and posture on a percentage basis down to the second decimal place. Differentiation is made between groups with little activity and groups with much activity. The conclusion is arrived at that gains in attitude, knowledge, motor ability and posture attributable to supervised activity in physical education are in excess of gains attributable to unsupervised activity. Motor ability tests known as the Minnesota Graybeal tests are described and tests of them are published. Measurements of growth in physical education are made, including gains in information or knowledge, in which a gain of 68 per cent was made by the experimental group and only 9.4 per cent by the control group. In motor ability the experimental group gained 7 per cent while the control group gained 10 per cent. In posture the experimental group gained 25 per cent while the control group gained 23 per cent, indicating, of course, no appreciable difference. The study should be of great interest to physical educators. To the medical reviewer it looks very much as if the summary and conclusions, so laboriously arrived

at, could have been pretty much predicted on the basis of general information and experience. The expression of percentages to the second decimal place in measuring such variable and subjective qualities as attitudes, knowledge, motor ability and posture gives a fictitious appearance of accuracy.

Sepsis nach Angina. Von Prof. Dr. W. Uffenorde und Prof. Dr. H. Claus. Heft 1, Hals-, Nasen- und Ohrenheilkunde, zwanglose Schriftenreihe. Herausgegeben von Prof. Dr. H. Loebell and Prof. Dr. W. Tonndorf. Second edition. Paper. Price, 4.50 marks. Pp. 37, with one illustration. Leipzig: Curt Kabitzsch, 1938.

As early as 1920 Mosher in this country called the attention of physicians to the septicemia which follows acute pharyngeal infections and which is due often to involvement of the jugular vein, secondary usually in his experience to deep cervical collections of pus. Some years later in Austria and Germany this topic aroused great interest. In Berlin a special pavilion was established in recognition of the fact that many obscure cases of septicemia arose from tonsillar infections. These, moreover, may have been mild and present some weeks before. The relationship between the severe present illness and the perhaps forgotten tonsillitis of sometime before was often not recognized. There remains considerable controversy as to the origin of septicemias from tonsillar infections. These are brought about, it is agreed, in more than one way. Rapidly fatal forms occur, usually by direct invasion of the blood stream by way of the retrotonsillar veins and without thrombophlebitic changes. More often thrombophlebitis of the retrotonsillar veins is present with possible extension as far as the internal jugular vein. Less directly, the veins may be attacked by inflammations involving lymph nodes in close contact with them or by being bathed in the pus of phlegmons arising in the interfascial spaces of the neck. These arise by direct extension from peritonsillar abscesses or secondarily by way of lymphadenitic and thrombophlebitic processes. Therapy consists of removal of the involved tonsils, drainage of cervical abscesses and ligation of the thrombosed jugular vein; in addition, use of sufanilamide and blood transfusions are considered useful. Most of these things the authors stress. They are pioneers in investigations of this type of disease and they have added greatly to its recognition and proper therapy. The specialist and general practitioner need to be aware of the information this work brings, to the end that many needless deaths from obscure sepsis may be prevented.

Archiv und Atlas der normalen und pathologischen Anatomie in typischen Röntgenbildern. Methodik der Röntgenuntersuchung des Kehlkopfes. Von Dr. Richard Waldapfel, Assistent der Ohren-, Nasen-, Halsabteilung der allgemeinen Poliklinik in Wien. Fortschritte auf dem Gebiete der Röntgenstrahlen, Ergänzungsband LIII. Herausgeber: Prof. Grashey. Paper. Price, 17.60 marks. Pp. 91, with 77 illustrations. Leipzig: Georg Thieme, 1938.

The first attempts to examine the larynx roentgenologically were made at the beginning of this century. First the position of the vocal cords was studied by Scheier. Later on Thost presented the diseases of the larynx and its neighboring organs in a special atlas. The new textbook of Waldapfel deals with the same area taken from the rich material of the Clinic Hajek, Vienna. In addition to the transverse and anteroposterior exposure Waldapfel makes use of the placement of a film in the retropharyngeal space. A film specially cut is introduced into the retropharyngeal space as far as the beginning of the esophagus after anesthetization of the posterior wall of the retropharynx and is held by a forceps. Exposure is taken by the experiment of Valsalva to increase the contrast between the air and the soft tissues. Furthermore, the examination of Fonsson is recommended. The larynx is moved forward. By means of air inflation in the retropharyngeal space it is possible to visualize the retrolaryngeal and hypopharyngeal space also and to discover the involvements in the posterior portions of the larynx in their full extent. The author points out the objects of x-ray examination of the larynx as follows: outlines and extent of laryngeal processes; narrowing of the air space; size and extent of stenosis; extent of involvements in front and behind the larynx, and thickening and destruction of cartilaginous parts of the larynx. Numerous instructive roentgenograms and sketches with interpretations make the results of examination understandable to every laryngologist. Here we are dealing with a supplementary examination; all the other clinical examinations have to be done in advance.

A Text-Book of Pharmaceutics. By Arthur Owen Bentley, Reader in Pharmaceutics and Head of the School of Pharmacy in the University College of Nottingham, and others. Fourth edition. Cloth. Price, $5. Pp. 1,001, with 234 illustrations. Baltimore: William Wood & Company, 1937.

This is a book on the practice of pharmacy in accordance with the Addendum (1936) to the British Pharmacopeia and the British Pharmaceutical Codex of 1934; and it incorporates, as the author states, the recent advances in pharmaceutical education as is evidenced by such chapters as the ones on osmotic pressure, isotonic solutions, electrolysis and hydrogen ion concentration, absorption, viscosity determinations, the colloidal state, and the theory of emulsions. The first part of the book discusses the political history of pharmacy in Great Britain. Part 2 takes up general principles and apparatus; part 3, dispensing; part 4, pharmaceutical preparations. In part 5, under the heading of pharmaceutical biology, are taken up the matters of bacteriology, sterilization, preparation of solutions for parenteral administration, vaccines and serums. Part 6 discusses briefly the principle of biologic assay of pharmaceutical preparations. There are a good many items in this book that might with advantage be incorporated in the current pharmaceutical education in this country; and for this reason the book is recommended to pharmaceutical libraries, teachers of pharmacy and practicing pharmacists who wish to keep abreast with the trend of pharmaceutical progress in the British Empire.

Father's Doing Nicely: The Expectant Father's Handbook. By David Victor. With a foreword by George W. Kosmak, M.D. Cloth. Price, $1.50. Pp. 170, with illustrations by Tom Torre Bevens. Indianapolis & New York: Bobbs-Merrill Company, 1938.

The glory of motherhood and the role of the mother in childbearing have been rightfully extolled. The role of the father, however, has received but scant attention. The problems of reproduction must be shared by both mother and father. Although many books have been written about motherhood, this small book presents the problems of the father. The birth of a baby in the average American household is still the most important and exciting event in the lifetime of that household. It calls for tremendous physical, environmental and economic adjustment. The peace and welfare of a family may be seriously jeopardized. Failure of adjustment to the new situation may result in irreparable damage to the family. Any information which helps to make this transition easier and more natural renders a distinct service. The author discusses the many problems involved in the birth of a baby in an amusing and yet instructive manner. Thus, the father is gently led over such hurdles as the economics of childbearing, the trials and tribulations of labor, and the environmental adjustment in the home. The father is made to feel that he is a true partner in the present and future of the new heir or heiress. The book can be heartily recommended to expectant fathers.

La maladie de Lobstein: Le syndrome des sclérotiques bleues dans ses rapports avec la fragilité osseuse et l'hérédo-syphilis. Par Georges Carrière, professeur de clinique médicale, Claude Huriez, professeur-agrégé à la Faculté de médecine de l'Université de Lille, et William Hocq. Paper. Pp. 163, with 29 illustrations. Paris: G. Doin & Cie, 1938.

This is a monograph on the syndrome of blue sclerotics with osteopsathyrosis, or fragilitas ossium, called Lobstein's disease after Lobstein's report in 1933. The authors divide the ocular syndrome with blue sclerotics into (1) the osseous syndrome with psathyrotic deformities and developmental changes of bone; (2) the auricular syndrome, namely deafness; (3) the articular syndrome, and (4) the endocrine syndrome. The most constant observations are the blue sclerotics, which are of diagnostic significance if they are familial and associated with auditory symptoms. The authors distinguish between complete and incomplete forms of Lobstein's disease. In discussing the osseous symptoms they mention also the vertical form of osteopsathyrosis. The craniofacial deformations are particularly frequent; the occluding temporal and frontal bones, the smallness of the face and the skull, the thinning of the cranial wall. The articular syndrome is merely excessive relaxation of the joints, which is inconstant. The auricular syndrome is particularly otosclerosis. Much space is devoted to the endocrine aspects. The authors mention various deficiencies but particularly the

dysfunction of the parathyroids. They point to the frequent finding of hypocalcemia and regard it rational to consider the removal of the parathyroid. This was done in two patients; while it is too early to report definitely, there have been no successive fractures, the calcemia being at normal level. The authors state that in the great majority of cases the disease, which is hereditary or familial, shows hereditary stigmas such as high infant mortality, frequency of osseous malformation and dental changes of hereditary aspect, frequent polyglandular syndromes, and finally the articular and auricular symptoms which are, according to the authors, similar to those of tabes. While it must be admitted that the pathogenic background of this disease is little documented, the book is to be recommended as a scientific and thorough treatise on this disease.

Ophthalmoskopische Studien in monochromatischem, subjektiv veränderlichem Licht. I. Der normale Augenhintergrund. Von Ingemar Kugelberg. Med. Lic. Inauguraldissertation welche mit gehöriger Genehmigung der weiterfahrenen medizinischen Fakultät zu Uppsala verteidigt wird. Paper. Pp. 183, with 7 illustrations. Uppsala: Almqvist & Wiksells, 1937.

Kugelberg has exhausted the study of the possible investigative methods with the instrument available in a review of the conditions found in the normal fundus with monochromatic light. His monochromatic apparatus consists of an Abbe prism of constant diversion which outlines a spectrum by means of the illuminous slit from an arc light which is intersected by a second slit providing a desired wavelength. By turning the prism one obtains successive wavelengths, which on account of the fluctuating dispersion and intensity may be corrected by the change in size of the slit. The apparatus is checked for measurement of wavelength by means of a linear spectrum and thereby the consistency of the monochromatic nature of the wave is assured. The pamphlet is divided into ten chapters, on (1) introductory matter and survey, (2) method, (3) survey of the normal background of the eye in monochromatic light, (4) the retinal arteries, (5) the retinal veins, (6) the choroidal vessels, (7) the reflex of the retinal vessels, (8) the diffusion of light in the choroid, (9) the reflection on the internal limiting membrane and the striped structures of the nerve fiber layers, and (10) the question of the macula. A good summary of the work is incorporated in the final six pages of the pamphlet. Pertinent references fill another six pages. The material constitutes a comprehensive review and experimental insight into this limited field of endeavor. The author intends to continue with an anatomicohistologic study to verify his results.

Pharmaceutical Therapeutics with Pharmacology, Posology and Toxicology. By Eldin V. Lynn, Ph.D., Professor of Chemistry, Massachusetts College of Pharmacy, Boston. Second edition. Cloth. Price, $4. Pp. 430. New York & London: McGraw-Hill Book Company, Inc., 1938.

The object of this book is to present for students and practitioners of pharmacy the essential facts of pharmacology, toxicology and therapeutics of all drugs appearing in the United States Pharmacopeia, the National Formulary and New and Nonofficial Remedies (unfortunately abbreviated throughout as N. R. instead of N. N. R.); a few drugs not appearing in any of these publications are also included. The task is accomplished most admirably, and it would seem that in its new edition this work would be practically indispensable to the pharmacist studiously interested in the practice of his venerable and important profession.

Die endokrinen Erkrankungen: Ihre Klinik, Pathologie und Therapie. Von Prof. Dr. N. v. Jagić, Vorstand der zweiten medizinischen Universitätsklinik, Wien, und Doz. Dr. K. Fellinger, Vorstand der intern. u. Stoffw.-Abt. am Krankenhaus der Stadt Wien. Paper. Price, 9 marks. Pp. 295, with 37 illustrations. Berlin & Vienna: Urban & Schwarzenberg, 1938.

This book is intended to aid the physician in finding his way through the maze of endocrine diagnosis and in separating the valuable from the worthless endocrine remedies. The authors present a fairly critical summary of endocrine diseases; but the glandular preparations recommended, or suggested for trial, include many of dubious potency and a few for which there is no excuse. Even though no great enthusiasm is shown for these products, they would better have been omitted or properly classified.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Taxes: Liability of Optometrist for Retailers' Occupation Tax.—The Illinois Retailers' Occupation Tax Act imposes a tax on the seller of tangible personal property at retail. The State Department of Finance promulgated a rule under the act to the effect that "if optometrists or oculists also act as opticians, or sell spectacles, eyeglasses, lenses, frames, or other tangible personal property to users or consumers, they incur liability for tax with respect to receipts from such sales." The plaintiffs, optometrists, instituted a suit to restrain the collection of the tax sought to be imposed on them. The trial court entered a decree for the defendants, the Director of Finance and the Attorney General, and the plaintiffs appealed to the Supreme Court of Illinois.

The sole question before the court was whether the fact that in the carrying on of the practice of optometry the person receiving the service, if called on to purchase eyeglasses, frames or other tangibles from the optometrist, participates in a sale of tangibles which is taxable under the Retailers' Occupation Tax Act. If, said the court, it becomes necessary for a physician to furnish medicine or surgical dressings in effecting a cure, he certainly does not thereby come within the designation of those engaged in a calling which would result in the imposition of a retail tax. The same reasoning applies to dentists even though that calling requires the furnishing of certain inlays, fills or crowns, or even false teeth, if necessary to a completion of the dental service. The exemption of these two professions from the operation of the act was recognized by a special rule promulgated by the Department of Finance. The main object and purpose of optometry, in the opinion of the court, is to furnish service to one requiring a correction of vision. It is not a craft or a trade, but a personal professional calling in which a reputation is built up because of the efficiency of the service rendered. The requirements of the optometry practice act insist on a good moral character on the part of an applicant for a license, graduation from an approved school of optometry, and the passing of satisfactory examinations and tests as to educational fitness. Not one of these requisites is necessary for one engaged in the business of the retail sales of tangibles.

In the opinion of the court the legislature, in providing for the licensing of optometrists, created a calling distinct in its character from that of the retailer who sells similar tangibles in the pursuit of a trade, and the optometrist engaged solely in his professional occupation is not subject to the tax. The decree of the trial court was therefore reversed and the case remanded with directions.—*Babcock v. Nudelman (Ill.), 12 N. E. (2d) 635.*

Compensation of Physicians: Liability of Father for Medical Services Rendered to Adult Son.—The defendant's adult son was critically injured and was immediately taken to a hospital. The defendant hurried to the hospital and after considering the advisability of obtaining the services of two other physicians he finally authorized the chief surgeon of the hospital to operate on the son, telling him to do all that he could for the patient and to spare no expense. On being told that a special night nurse was needed, the father authorized the surgeon to get one and reiterated the statement to spare no expense. A day nurse was employed, as was also a physician to assist in the operation. Thereafter the father refused to pay the expense incurred in the treatment of his son, and the hospital, the chief surgeon, the assistant physician and the two nurses instituted separate actions against the father. By agreement, the cases were tried together. The trial court gave judgment in each case against the defendant, who thereupon appealed to the Supreme Court of South Carolina, denying liability on the ground that he had made no contract to pay for the services.

As a rule, said the Supreme Court, a request by a parent to a physician to attend an adult child does not create an implied

contract on the part of the parent to pay for the services rendered by the physician. This rule, however, is not of invariable application, for the conditions and circumstances surrounding the parties at the time the request is made, as well as the utterances on the subject, must be taken into consideration. If, under the facts and circumstances, the physician is justified in believing and relying on the parents' intention to pay for the services rendered, although there is no express promise to pay therefor, an implied contract to pay is created. If there is nothing in the facts and circumstances suggesting to the physician that the parent intends to assume the legal obligation to pay, at the time the request for services is made, the parent is no more legally liable for services rendered to his adult child, living away from his home, than he would be for services requested to be rendered to a total stranger. There was no express contract in the present case but the court was of the opinion that the surrounding circumstances were such as to create an implied contract. When the father arrived at the hospital, he was advised that he could employ any surgeon he preferred to perform the necessary surgical operation. The father selected the chief surgeon, telling him to do everything possible for his wounded son and to spare no expense. If the statement made by the defendant had related to a stranger or a mere acquaintance, no liability would have been established. But here, the court pointed out, a father, on being advised of his wounded son's condition, came a long distance after night, and on finding his own flesh and blood in a critical condition, asked about other physicians and then, after conferring with other persons present, authorized the chief surgeon to proceed with the operation and to spare no expense. Such evidence, the court said, was sufficient to justify the trial court in submitting the issue to the jury as to whether or not an implied contract existed.

The defendant further contended that he was not liable for the services rendered by the day nurse, because the agency of the chief surgeon to employ her was proved only by his statements, which were insufficient to establish the agency. While it is true, the court said, that the declarations of an agent alone as to his agency are insufficient to prove the agency, it is also well established that if there are other corroborating facts and circumstances disclosed by the testimony, the existence of the agency then becomes a question for the jury. The court could find no error in the submission of this question to the jury.

The judgments in favor of the individual plaintiffs were affirmed.—*Broadway v. Jeffers, and four other cases (S. C.), 194 S. E. 642.*

Workmen's Compensation Acts: Employer's Liability for Expense of Hospitalization Beyond Statutory Limits.—The defendant company sent one of its injured employees to the plaintiff hospital for treatment. The services rendered by the hospital extended from July 25, 1931, to June 18, 1932. Apparently, the hospital entered the charge for the services against the employer's insurer and from time to time sent bills to the insurer but received no payment. Eventually the insurer went into bankruptcy, and the hospital thereafter sought to collect from the defendant company. Finally suit was instituted and the trial court gave judgment for the hospital. The defendant company appealed to the Supreme Court of Wisconsin, contending, among other things, that it was not liable because of the fact that the hospital did not extend credit to it but to the insurer.

Liability for the expenses incident to hospitalization, the court said, does not depend on to whom credit was extended but on who in law was responsible for the payment of the bill. The employee himself was doubtless responsible for payment. The defendant company was also responsible for its payment because the workmen's compensation act made it responsible. The insurance company was also responsible for its payment because of its policy of indemnity to the defendant. That the hospital and the defendant company both considered the case as a compensation case was plain. This being so, the defendant was in effect a surety for the employee, and the insurance company was a surety for the defendant and therefore for the employee. The liability of the defendant was not affected, the court said, because it procured indemnity insurance or because the plaintiff sought payment from the defendant's surety and failed to recover because of the surety company's bankruptcy. Where the relation of principal and surety exists, efforts to collect from a surety that fail do not relieve the principal.

The defendant further contended that, even if it was under contractual obligation to pay for the employee's hospitalization, its obligation was limited under the workmen's compensation act to hospitalization for ninety days. The act, however, the court pointed out, does not limit the obligation to ninety days but provides for liability beyond that period if in the opinion of the industrial commission further hospitalization will tend to lessen the period of compensable disability. The liability of the defendant for the expenses incident to hospitalization continued until such time as it was terminated by objection by the defendant to further hospitalization at its expense. No such objection was interposed in the present case. Liability would extend for at least a reasonable time, and there was no contention that hospitalization was unreasonably extended or unreasonably furnished in this case. The court was of the opinion therefore that, in absence of any objection by the defendant to hospitalization furnished, the defendant was properly adjudged liable for the amount allowed by the trial court.

The judgment of the trial court for the hospital was therefore affirmed.—*St. Mary's Hospital & Training School for Nurses of Sisters of Misericordia v. Atlas Warehouse and Cold Storage Co. (Wis.), 277 N. W. 144.*

Society Proceedings

COMING MEETINGS

American Academy of Ophthalmology and Oto-Laryngology, Washington, D. C., Oct. 9-14. Dr. William P. Wherry, 107 South 17th St., Omaha, Executive Secretary.
American Association for the Study of Goiter, Washington, D. C., Sept. 12-14. Dr. W. Blair Mosser, 133 Biddle St., Kane, Pa., Secretary.
American Association for the Study of Neoplastic Diseases, Washington, D.C., Sept. 8-10. Dr. Eugene R. Whitmore, 2139 Wyoming Ave. N.W., Washington, D. C., Secretary.
American Association of Obstetricians, Gynecologists and Abdominal Surgeons, White Sulphur Springs, W. Va., Sept. 22-24. Dr. James R. Bloss, 418 Eleventh St., Huntington, W. Va., Secretary.
American Association of Railway Surgeons, Chicago, Sept. 19-21. Dr. Daniel B. Moss, 547 W. Jackson Blvd., Chicago, Secretary.
American Congress of Physical Therapy, Chicago, Sept. 12-15. Dr. Richard Kovacs, 1100 Park Ave., New York, Secretary.
American Hospital Association, Dallas, Texas., Sept. 26-30. Dr. Bert W. Caldwell, 18 East Division St., Chicago, Executive Secretary.
American Roentgen Ray Society, Atlantic City, N. J., Sept. 20-23. Dr. Carleton B. Peirce, University Hospital, Ann Arbor, Mich., Secretary.
Association of Military Surgeons of the United States, Rochester, Minn., Oct. 13-15. Dr. H. L. Gilchrist, Army Medical Museum, Washington, D. C., Secretary.
Central Association of Obstetricians and Gynecologists, Minneapolis, Oct. 6-8. Dr. William F. Mengert, University Hospitals, Iowa City, Secretary.
Clinical Orthopedic Society, Nashville, Tenn., and Birmingham, Ala., Oct. 7-8. Dr. H. Earle Conwell, 215 Medical Arts Bldg., Birmingham, Ala., Secretary.
Colorado State Medical Society, Estes Park, Sept. 7-10. Mr. Harvey T. Sethman, 537 Republic Bldg., Denver, Executive Secretary.
Delaware, Medical Society of, Dover, Oct. 10-12. Dr. Allan V. Gilliland, Smyrna, Secretary.
Idaho State Medical Association, Sun Valley, Sept. 6-10. Dr. Harold W. Stone, 105 North Eighth St., Boise, Secretary.
Indiana State Medical Association, Indianapolis, Oct. 4-6. Mr. Thomas A. Hendricks, 23 East Ohio St., Indianapolis, Executive Secretary.
Kentucky State Medical Association, Louisville, Oct. 3-6. Dr. Arthur T. McCormack, 620 South Third St., Louisville, Secretary.
Michigan State Medical Society, Detroit, Sept. 19-22. Dr. L. Fernald Foster, 311 Center Ave., Bay City, Secretary.
Mississippi Valley Medical Society, Hannibal, Mo., Sept. 28-30. Dr. Harold Swanberg, 510 Main St., Quincy, Ill., Secretary.
Nevada State Medical Association, Reno, Sept. 23-24. Dr. Horace J. Brown, 120 N. Virginia St., Reno, Secretary.
Northern Minnesota Medical Association, Crookston, Aug. 29-30. Dr. J. F. Norman, Crookston, Secretary.
Oregon State Medical Society, Timberline Lodge, Aug. 24-27. Dr. Morris L. Bridgeman, 1020 S.W. Taylor St., Portland, Secretary.
Pacific Association of Railway Surgeons, Los Angeles, Oct. 7-8. Dr. W. T. Cummins, Southern Pacific General Hospital, San Francisco, Secretary.
Pennsylvania, Medical Society of the State of, Scranton, Oct. 3-6. Dr. Walter F. Donaldson, 500 Penn Ave., Pittsburgh, Secretary.
Society of American Bacteriologists, San Francisco, Aug. 30-Sept. 1. Dr. I. L. Baldwin, College of Agriculture, University of Wisconsin, Madison, Wis., Secretary.
Utah State Medical Association, Ogden, Sept. 1-3. Dr. D. G. Edmunds, 610 McIntyre Bldg., Salt Lake City, Secretary.
Vermont State Medical Society, Burlington, Oct. 6-7. Dr. B. F. Cook, 154 Bellevue Ave., Rutland, Secretary.
Virginia, Medical Society of, Danville, Oct. 4-6. Miss Agnes V. Edwards, 1200 East Clay St., Richmond, Secretary.
Washington State Medical Association, Bellingham, Aug. 29-31. Dr. V. W. Spickard, 1303 Fourth Ave., Seattle, Secretary.
Wisconsin, State Medical Society of, Milwaukee, Sept. 13-16. Mr. J. G. Crownhart, 119 East Washington Ave., Madison, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1928 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American J. Digestive Diseases, Huntington, Ind.

5: 281-344 (July) 1938

Comparison of Streptococci from the Colon with Bargen's Organism. J. F. Kessel, Los Angeles.—p. 281.

IV. Experimental Study of Hydrogen Ion Concentration and Chemistry of Bile, Its Effect on Stones and a Suggestion as to Therapeutic Application of Ox Bile in Gallbladder Disease. S. Morrison, M. Feldman, J. C. Krantz Jr. and Frances F. Beck, Baltimore.—p. 288.

Effect of Estrogenic Hormone on Gastric Acidity. L. Schiff and H. Felson, with technical assistance of Jane Graff and Betty Meyer, Cincinnati.—p. 292.

*Migraine; Epilepsy: Their Association with Hypothyroidism. A. I. Rubenstone, Philadelphia.—p. 295.

Phenolphthalein. H. W. Soper, St. Louis.—p. 297.

Study of Diseases in the Negro, with Particular Reference to the Gastrointestinal Tract. I. C. Sharon, Cincinnati.—p. 298.

Practical Method for Determining Concentration of Buffer Salts in the Body Fluids. A. W. Oelgoetz, Columbus, Ohio.—p. 311.

Terminal Ileitis: Conservative Surgical Treatment. I. Kross, New York. —p. 313.

Karaya Gum as Mechanical Laxative: Experimental Study on Animals and Man. A. C. Ivy and Bertha L. Isaacs, Chicago.—p. 315.

Intussusception in the Adult. R. Finkelstein, Brooklyn.—p. 322.

Migraine, Epilepsy and Hypothyroidism.—Rubenstone describes a woman with migraine and epilepsy whose two daughters were subject to migraine, one with the abdominal type and the other the cephalic. Hypothyroidism without the picture of myxedema was found in all three. They promptly responded to thyroid replacement therapy. Of the many theories regarding etiology, the most plausible is inherited allergic susceptibility with superimposed exciting causes, endocrine imbalance being the most prominent. The frequent low metabolic readings are significant of lowered thyroid function. The symptomatic relief produced by ergotamine tartrate may be due to its suddenly boosting endocrine function. For the recognition of the hypothyroid state it is important that basal metabolic readings be made as near as possible to an approaching attack and never immediately after.

American Journal of Physiology, Baltimore

123: 1-280 (July) 1938

Experimental Renal Hypertension and Adrenalectomy. D. A. Collins, Minneapolis, and E. H. Wood, Philadelphia.—p. 224.

Nitrogen Excretion on Nitrogen Free Diet. W. H. Seegers, Yellow Springs, Ohio.—p. 233.

Experimental Production of Ovulation, Luteinization and Cysts of Corpus Luteum in Adrenalectomized Anestrous Cats. H. B. Friedgood and M. A. Foster, Boston.—p. 237.

*Observations on Blood Sugar Level Before, During and After Hunger Periods in Humans. W. W. Scott, C. C. Scott and A. B. Luckhardt, Chicago.—p. 243.

Effect of Alcohol on Hunger Sense. C. C. Scott, W. W. Scott and A. B. Luckhardt, Chicago.—p. 248.

Effect of Calcium on Output of Sympathin in the Frog's Heart. K. Lissák, Boston.—p. 256.

Excretion of Endogenous "Creatinine" by the Human Kidney. T. Findley Jr., St. Louis.—p. 260.

Effect of Combined Thyroidectomy and Gonadectomy on Compensatory Adrenal Hypertrophy in Unilaterally Adrenalectomized Rats. Isolde T. Zeckwer, Philadelphia.—p. 266.

Utilization of β Hydroxybutyric Acid by Isolated Mammalian Heart and Lungs. R. H. Barnes, La Jolla, Calif., E. M. MacKay, San Diego, Calif.; G. K. Moe, and M. B. Visscher, Minneapolis.—p. 272.

Blood Sugar Level and Hunger.—The Scotts and Luckhardt find that the level of the blood sugar of the fasting human subject remains constant at the time the empty stomach is undergoing changes in activity. If there was any causal relationship between this level and hunger contractions this would not be the case. If a causal relationship existed, there should be a fall (or rise) in the level of the blood sugar preceding the onset of the contractions and a subsequent rise (or fall) in the level after the contractions had ceased. This order of events would have to repeat itself before each succeeding hunger period. No evidence could be found for these hypotheses.

Annals of Otol., Rhinol. and Laryngology, St. Louis

47: 291-576 (June) 1938. Partial Index

Base of Skull, with Particular Reference to Fractures. W. J. Mellinger, Santa Barbara, Calif.—p. 291.

Treatment of Tuberculosis of Trachea and Bronchi. J. D. Kernan, New York.—p. 306.

Further Study of Pathology of Acute Laryngotracheobronchitis in Children. L. Richards, Boston.—p. 326.

*Analysis of Seventy-Five Cases of Bronchiectasis from the Point of View of Sinus Infection. R. L. Goodale, Boston.—p. 347.

Clinical Application of Galvanic Falling Reaction. E. J. Blonder, Chicago.—p. 384.

Longitudinal and Cavernous Sinus Thrombosis. C. W. Irish, Los Angeles.—p. 402.

Reconstruction Surgery of the Nose. G. W. Pierce and G. B. O'Connor, San Francisco.—p. 437.

Laryngectomy: One Stage. W. F. Zinn, Baltimore.—p. 453.

Calcium Cevitamate in Treatment of Acute Rhinitis. S. L. Ruskin, New York.—p. 502.

Studies on Intranasal Preventive Treatment of Poliomyelitis. M. C. Myerson, New York.—p. 531.

Bronchiectasis and Sinus Infection.—Goodale studied the part that sinus infection played in seventy-five cases of bronchiectasis. According to x-ray evidence, forty-six patients now have chronic sinus infection and twenty-nine have negative sinuses. Of the twenty-nine negative cases, eighteen have a history or clinical evidence suggestive of sinusitis, either a recurrent acute sinusitis or a mild chronic sinusitis. In eleven cases (14.5 per cent) sinusitis seems to have had no part in the onset or subsequent course of the bronchiectasis. There seem to be several different diseases which can cause bronchiectasis. The largest group is that of infections of the upper part of the respiratory tract. Pneumonia alone accounts for twenty-one cases. These cases show a marked susceptibility to severe infection of the upper part of the respiratory tract. As time goes on these repeated infections have produced the picture of sinus disease which is greater than the etiology would indicate. It is found that the prevalence of sinus infection parallels the extent of the bronchiectasis. Reduced to percentages, the sinuses are infected in 40.7 per cent of those cases in which only one lobe is involved and in 73 per cent of cases in which more than one lobe is involved. Once the patient has acquired a chronic sinusitis, the chance of further damage to the lungs is increased because these patients are more susceptible to repeated infections of the respiratory tract.

Archives of Dermatology and Syphilology, Chicago

38: 1-162 (July) 1938

Urticaria: VI. A New Immunologic Wheal Produced Experimentally by Reverse Technic. A. Walzer, Brooklyn.—p. 1.

Chromoblastomycosis Caused by Fungus of Genus Hormodendron. J. M. Gomes, São Paulo, Brazil.—p. 12.

*Albuminuria in Association with Scabies: Review of Literature and Report of Urinalyses in 216 Cases. H. D. Niles, New York.—p. 19.

Case of Inherited Ainhum-like Hyperkeratosis. R. L. Sutton Jr., Kansas City, Mo.—p. 26.

Production of Surface Growth of Pathogenic Fungi on Culture Mediums: Some Factors of Importance. J. W. Williams, Cambridge, Mass.— —p. 32.

Effects of Roentgen Rays on Fungi in Vitro. H. P. Jacobson, Los Angeles.—p. 38.

Dermatitis Produced by Petrolatum: Report of Case. L. Hollander, Pittsburgh.—p. 49.

Mucous Gland Tumors of Skin. J. E. Ginsberg, Chicago, and M. J. Reuter, Milwaukee.—p. 52.

Incontinentia Pigmenti (Bloch-Sulzberger): Report of Additional Case, with Comment on Possible Relation to New Syndrome of Familial and Congenital Anomalies. M. B. Sulzberger, New York, with collaboration of J. F. Fraser, New York, and L. Hutner, Richmond Hill, N. Y. —p. 57.

*Survey of Syphilis Among Students at University of Wisconsin. L. R. Cole, Madison, Wis.—p. 70.

Albuminuria and Scabies.—Niles examined the urine of 216 patients with scabies, most of whom were from the lower economic level. Their ages ranged from 19 months to 78 years. In order to eliminate the possibility of renal damage from the medication prescribed, the urine almost always was examined at the time of the first visit. Only sixteen patients showed even the slightest trace of albumin in the urine on one examination. The average age of patients of both sexes who showed

albuminuria was 6.5 years less than that of the whole group of patients with scabies. The average duration of scabies in the patients with albuminuria was 1.9 months in the entire series. This does not support the contention of some authors that albuminuria is more frequent with neglected scabies of long duration. None of the 216 patients had casts. Six patients showed varying amounts of sugar, twenty indican and twenty-seven pus cells. Of the seven patients who returned for reexamination, four failed to show albumin after the disappearance of the scabies, but in the other three albuminuria persisted for many months after the eruption had disappeared. In the three patients whose albuminuria continued after the disappearance of the scabies there probably was no relation between the two conditions, although they may furnish examples of the rare complication described by some authors as persistent albuminuria following scabies. The incidence of 7.4 per cent of albuminuria on one examination of the 216 patients suffering from scabies is not necessarily of any significance, as it is no higher than the percentage found in some reports of routine urinalyses of normal subjects.

Syphilis Among University Students.—Cole states that a total of 3,389 tests was done on 30.5 per cent of the student population of the University of Wisconsin. In two cases persistent 1 plus reactions and in one case a 2 plus reaction were found. The two patients with 1 plus reactions were women and the 2 plus reaction was that of a man from rural Wisconsin. Two men from urban centers in Wisconsin were discovered to have 4 plus reactions. These patients reported to the department of student health and were referred to private physicians for treatment. Six doubtful reactions were reported but the subjects never showed anything more than doubtful reactions. A legitimate criticism that the student with known syphilis will not report in a voluntary program of this type may be raised. Syphilis, however, seems to be extremely rare. Of approximately 2,000 admissions to the infirmary and approximately 50,000 outpatient visits during any year, only one or two cases of syphilis were discovered. Wassermann tests should be performed as a routine on each newly entering student and on each graduating student.

Archives of Surgery, Chicago

37: 1-174 (July) 1938

Stereomicroscopic Study of Surface of Lung: I. Description of Methods Used. M. Joannides, Chicago.—p. 1.
Id.: II. Anatomic and Physiologic Structure of Normal Lung: Résumé of Observations Based Largely on Stereomicroscopic Study of Surface of Lungs Fixed and in Living State. M. Joannides, Chicago.—p. 7.
*Chronic Appendicitis: Is It a Clinical Entity? H. J. Shelley, New York.—p. 17.
Subacute Infections of Bone: Osteoperiostitis Albuminosa Ollier. J. R. Kuth, Duluth, Minn.—p. 46.
Tic Douloureux: Partial Section of Root of Fifth Cranial Nerve; Comparison of Subtemporal and Cerebellar Approaches from Surgical and Physiologic Standpoints. O. R. Hyndman, Iowa City.—p. 74.
Thrombosis of Left Internal Carotid Artery. W. H. Chao, S. T. Kwan, R. S. Lyman and H. H. Loucks, Peiping, China.—p. 100.
*Pilonidal Sinus: Sclerosing Method of Treatment. L. H. Block, Chicago, and B. L. Greene, Elgin, Ill.—p. 112.
New Apparatus for Maintaining Hot Compresses at Constant Temperature. K. L. Cooley, Rochester, N. Y.—p. 123.
Bilateral Collapse Therapy in Treatment of Pulmonary Tuberculosis. B. P. Potter, Secaucus, N. J.—p. 132.
Duodenogastric Intussusception: Its Clinical Application and Results. J. K. Berman, Indianapolis.—p. 139.
Origin of Carcinoma in Chronic Gastric Ulcer. S. H. Klein, New York.—p. 155.

Chronic Appendicitis.—In an attempt to determine whether or not there is such a clinical entity as chronic appendicitis, Shelley compared the pathologic changes in appendixes believed either before or after removal to have been the cause of symptoms with the changes in those which apparently had never been the cause of symptoms. He determined the incidence of pathologic changes in appendixes supposed to have been the cause of symptoms according to symptoms, physical and laboratory observations, sex and age. The percentages of the patients followed up who remained free from symptoms was computed according to the pathologic change found in the appendix. A chronic inflammatory process, adhesions, fecaliths or combinations of these conditions in the appendix have been shown to be the cause of definite symptoms and physical changes which can be relieved by appendectomy. A general term "chronic appendicitis" is suggested to cover these conditions. In properly selected cases an appendectomy for chronic appendicitis gives an excellent expectation of cure, but the following points should be considered: 1. In the presence of a history of nausea and vomiting or of constipation, especially in women, particular care must be exercised in the selection of cases. 2. The more definite and localized the physical changes, the better is the expectation of cure. When tenderness is found in other parts of the abdomen than the lower part of the right quadrant, one should be most reluctant to attribute the patient's symptoms to chronic appendicitis. 3. The expectation of cure is excellent when there is a history of more than one attack within a period of one year or less, much poorer when the attacks cover a period longer than one year and poorest when the patient is operated on in or following the first attack. When no inflammatory change is found in the appendix, the expectation of cure is not good unless either adhesions or fecaliths are present, in which case the results are nearly equal to those obtained when inflammatory changes are present. Owing to recurrent attacks, there is evidently an increase in the pathologic condition in the appendix, as the change with age is much more marked than in the absence of symptoms attributable to the appendix. When a patient has been operated on because of symptoms and physical signs diagnostic of acute or subacute appendicitis and, instead, one of the types of chronic appendicitis (or adhesions or fecaliths without inflammation) is found, the expectation of a permanent cure is excellent.

Pilonidal Sinus.—Block and Greene discuss four years of experience with the use of a sclerosing solution in the treatment of pilonidal sinus. The sclerosing method was employed in eleven cases of pilonidal sinus, whether the condition was acute or chronic and whether it was simple or complicated. In two or three days after an initial simple incision of the sinus, the sclerosing treatment is instituted. The pack is removed carefully and gently; the table is tilted so as to lower the upper half of the body to an angle of about 66 degrees, and the wound is completely filled with a 2 per cent solution of butyn for five minutes (anesthesia). The skin around the wound is covered with petrolatum or a zinc oxide ointment. The butyn solution is then wiped up and the wound is filled completely with a modified Carnoy solution, which is allowed to remain for five or ten minutes (usually only five minutes). This tans the tissue and acts as an effective hemostatic. Any excess solution is then removed and the wound is packed carefully, as before, with iodoform gauze. A proper dressing is applied. This process is repeated every three or four days until complete healing ensues. It is imperative to prevent bridging over by frequently and carefully testing the resultant scar for any areas of defective healing. Occasionally it may be necessary to incise the operative area two or three times to insure the formation of a solid scar. The postoperative pain was trivial. A few patients complained of some discomfort for an hour or two after the treatment, but no patient complained of disabling pain. In most cases there was no purulent discharge after the first application of the sclerosing solution. There was rapid filling in of healthy granulation tissue. The minimal time required for complete healing was about four weeks and the maximum was ten weeks. The number of treatments varied from a minimum of eight to a maximum of twenty-two. The total average number of treatments after the initial incision was 16.2. There was absolutely no hospitalization, no loss of time from work or pleasure and no recurrence. In every instance a firm, simple, freely movable incisional scar formed, completely free from residual symptoms.

Bulletin New York Academy of Medicine, New York

14: 383-450 (July) 1938

*Viruses and Virus Diseases. T. M. Rivers, New York.—p. 383.
Isolation and Properties of Tobacco Mosaic and Other Virus Proteins (Harvey Lecture, March 17, 1938). W. M. Stanley, Princeton, N. J.—p. 398.
Vascular and Renal Complications of Pregnancy. W. W. Herrick, New York.—p. 429.

Viruses and Virus Diseases.—Rivers emphasizes the following points: There is no adequate reason why inanimate agents cannot induce infectious diseases. Nor is it sensible to state that protozoa, fungi, bacteria, spirochetes and rickettsiae are the only forms of living organisms capable of producing

such maladies. With regard to the nature of viruses there are three possibilities: Some of the viruses may be infinitely small living organisms, the midgets of the microbial world, possessed of a nature similar to that of living entities of sorts already known, ordinary bacteria and unicellular animals, differing from them only in respect to size; others may represent forms of life that are as yet unfamiliar, while still others may be inanimate transmissible incitants of disease. One, two or all three of the possibilities may be found to hold. Consequently, final decision regarding the matter should be deferred. In spite of the fact that some infectious agents may turn out to be fabrications of their hosts, one can safely say that no one has yet established the spontaneous origin of a single infectious disease and that regarding such diseases the law of obligate communicability still prevails.

California and Western Medicine, San Francisco

49: 1-104 (July) 1938

Syphilis in Relation to Surgical Problems. U. J. Wile, Ann Arbor, Mich. —p. 7.
Statewide Mental Hygiene Program: Its Importance to California. F. O. Butler, Eldridge.—p. 11.
Clinical Experiences and Experiments with Protamine Zinc Insulin: Potential Danger of Hypoglycemia. J. W. Sherrill, La Jolla.—p. 13.
Creatinuria of Childhood, with Special Reference to Bone Age. E. K. Shelton and B. N. Tager, Los Angeles.—p. 20.
Roentgen Ray Pelvimetry: Study of 320 Labors. C. T. Hayden, San Francisco.—p. 25.
Clinical Management of Skin Cancer. E. Liljencrantz and G. V. Kulchar, San Francisco.—p. 30.
Chronic Duodenal Stasis: Syndrome with Neurologic Symptoms. F. L. Reichert, San Francisco.—p. 37.
Ear Manifestations Following Head Injuries. F. Hand, San Francisco. —p. 42.
Anomalies of the Spine: Correlation of Anatomic, Roentgenologic and Clinical Findings. W. Bailey and R. A. Carter, Los Angeles.—p. 46.

Canadian Public Health Journal, Toronto

29: 251-320 (June) 1938. Partial Index

Bovine Tuberculosis in Children. R. M. Price, Toronto.—p. 251.
Survey of Certain Milk Borne Diseases in Canada. R. D. Defries, Toronto.—p. 255.
Bovine Tuberculosis in Canada. A. E. Cameron, Ottawa, Ont.—p. 262.
Changing Methods for Quantitative Estimation of Bacteria in Milk. H. R. Thornton, Edmonton, Alta.—p. 270.
Coliform Test in Pasteurized Milk. A. B. Moffat and J. Mackay, Toronto.—p. 283.
Use of Phosphatase Test in Control of Pasteurization. M. Doreen Smith, Toronto.—p. 288.
Nutritional Value of Raw and Pasteurized Milk. E. W. McHenry, Toronto.—p. 295.
Survey of Milk Control in Cities and Towns in Canada. A. E. Berry, Toronto.—p. 305.

Connecticut State Medical Society Journal, Hartford

2: 309-356 (July) 1938

Treatment of Congenital Syphilis. P. Harper, Bridgeport.—p. 319.
*Treatment of Bronchiectasis by Pulmonary Lobectomy: Summary of Ten Consecutive Cases. G. E. Lindskog, New Haven.—p. 320.
Studies in Convulsant Therapy: I. Technic and Clinical Phenomena. S. R. Dean, Newtown.—p. 325.
Cystic Tumor of the Tail of the Pancreas: Report of Case. S. V. Kibby, Los Angeles.—p. 331.
Lymphocytic Choriomeningitis: Report of Three Cases. A. H. Jackson, Waterbury.—p. 333.
Standard Procedure for Performance and Interpretation of Tuberculin Test. P. S. Phelps, Hartford.—p. 337.

Treatment of Bronchiectasis by Pulmonary Lobectomy.—Lindskog performed lobectomy in ten consecutive cases of bronchiectasis. The ages of the patients ranged from 10 to 43 years. The disease was bilateral in two and unilateral in eight. The shortest duration of symptoms prior to operation in any instance was six months, the longest from fifteen to twenty years. Cough and sputum were present in all. Hemoptysis was present at some time in seven of the ten cases and was recurrent and severe in six. Clubbing of the fingers was present to a noticeable degree in seven instances and was quite marked in several of these. The operative removal of the affected lobe or lobes was carried out in one stage, if the pleural cavity was found obliterated by adhesions at the time of the primary operation. This occurred in six cases. In three a two stage operation was done, the first stage consisting simply of thoracotomy, exploration and dissection of the affected lobe and the freeing of the pulmonary ligament followed by a mechanical abrasion of the parietal pleura with gauze to promote the formation of adhesions. The chest was then closed without drainage and the actual lobectomy was performed from two to six weeks later. At the time the diseased lobe or lobes were removed, the remaining cavity in the thorax was drained with a rubber tube or intercostal catheter until the cavity was entirely obliterated. The closure of the remaining space is effected by a compensatory enlargement of the residual lobe or lobes, elevation of the diaphragm, shift of the mediastinum and some contracture in the bony thorax. Evidences of bronchial fistulas in the healing hilus appeared postoperatively in seven instances, usually during the second week. All closed readily and spontaneously without further procedures. The postoperative hospitalization ranged from five to eleven weeks. There has been one operative death. The other nine patients are all living; the one operated on most recently is still in the hospital. Six patients are apparently in excellent condition, either cured or so greatly improved that they are able to lead a normal life. Four of these patients are completely free of cough and sputum, and two have occasional cough and sputum to a maximum of from 5 to 10 Gm. daily. Only one patient is considered to be in poor condition. In this instance a middle lobe was removed after several cautery operations had been performed by several surgeons for abscess of the lung. A lobectomy is contemplated for the remaining disease of the lower part of the right lobe. No patient has experienced a recurrence of hemoptysis. All have gained weight. None have suffered dyspnea after convalescence even with moderate exertion. A reduction in the available respiratory space has not been observed.

Delaware State Medical Journal, Wilmington

10: 123-146 (June) 1938

Extensive Case of Creeping Eruption from the State of Delaware. F. E. Kunkel, Philadelphia.—p. 123.
Urology: Its Relation to General Medicine. L. W. Anderson, Wilmington.—p. 129.
Forced Drainage of the Central Nervous System. S. Rochelson, New York.—p. 136.

Georgia Medical Association Journal, Atlanta

27: 253-296 (July) 1938

Relief of Causalgic-like Pain in the Isolated Extremity by Sympathetectomy: Case Report. R. F. Slaughter, Augusta.—p. 253.
The Changing Emphasis in Heart Disease. H. C. Atkinson, Macon.—p. 257.
Study of Maternal Mortality and Infant Deaths, 1937. H. F. Sharpley Jr., Savannah.—p. 261.
Some Errors in Diagnosis and Treatment of Cardiovascular Disease: Underdigitalization and Overdigitalization. H. Roesler, Philadelphia. —p. 267.
Crippled Children. F. G. Hodgson, Atlanta.—p. 271.
Perforated Peptic Ulcer: Report of Forty-Three Cases in the Negro. C. C. Garver, Atlanta.—p. 273.
Differential Diagnosis of Thyroid Disease: Indications for Medical, X-Ray and Operative Treatment. M. M. Hagood, Marietta.—p. 278.

Journal of Immunology, Baltimore

34: 429-500 (June) 1938

*Supplementary Report on Importance of Clostridium Welchii as an Etiologic Factor in Toxemia of Spreading Peritonitis Following Acute Perforative Appendicitis. H. A. Mengle, N. F. Paxson and J. O. Bower, Glenolden, Pa.—p. 429.
Serologic Tests with Pyrazolone Compounds. R. A. Harte, New York. —p. 433.
Blood Groups of Rwala Bedouin. W. C. Boyd and L. G. Boyd, Boston. —p. 441.
Survival of Influenzal Virus Under Various Conditions. H. W. Scherp, E. W. Flosdorf and Dorothy R. Shaw, Philadelphia.—p. 447.
Soluble Edema-Producing Substance from the Pneumococcus. W. D. Sutliff and T. E. Friedemann, Chicago.—p. 455.
Improved Procedure and Apparatus for Preservation of Serums, Micro-Organisms and Other Substances—The Cryochem Process. E. W. Flosdorf and S. Mudd, Philadelphia.—p. 469.

Clostridium Welchii in Spreading Peritonitis.—Mengle and his co-workers induced spreading peritonitis in twenty dogs which had previously been immunized against Clostridium welchii toxin, in order to ascertain what proportion of the animals so immunized would survive the infection. No other treatment was given. Spreading peritonitis was induced by opening the abdomen under strict aseptic precautions, ligating the appendix at its base, dissecting off and ligating the mesentery and administering 2 ounces (60 cc.) of castor oil. Of the twenty dogs, thirteen lived and seven died. This mortality may be compared with a control mortality, previously established in

earlier investigations, of more than 91 per cent. The marked drop in mortality in this group as compared with the control group leads one to believe that the toxemia accompanying spreading peritonitis may be largely produced by the toxin of Clostridium welchii.

Journal of Lab. and Clinical Medicine, St. Louis

23: 999-1110 (July) 1938

Effect of Temperature on Digitalis Action. R. A. McGuigan, Chicago.—p. 999.
*Excretion of Ingested Ethyl Alcohol in Saliva. T. E. Friedemann, W. G. Motel and H. Necheles, Chicago.—p. 1007.
*Comparison of Methods for Detecting and Grading Subclinical Scurvy. R. A. Sloan, Valhalla, N. Y.—p. 1015.
Staining Reactions of Fats After Use of Various Dyes and Fixing Agents. C. E. Black, Ann Arbor, Mich.—p. 1027.
Effects of Ligation of Common Bile Duct on Blood Iodine and Blood Counts of Male Rabbits. J. L. DeCourcy, C. D. Stevens, R. Weiskittel and N. Brower, Cincinnati.—p. 1037.
Cytologic Comparison of Malignant and Nonmalignant Nuclei and Nucleoli. M. Eva Haumeder, New Hampton, Iowa.—p. 1046.
*Superimposed Infection in Rheumatic Heart Disease. G. Friedman and J. R. Lisa, New York.—p. 1052.
Pressor Episodes, Diets and Toxicity of Morphine Sulfate. A. J. Nedzel, Chicago.—p. 1063.
Colloidal Carbon Flocculation Test in Spinal Fluid for Diagnosis of Neurosyphilis. S. Selesnick, Boston.—p. 1068.
Perfusion Stage for Observations on Daphnia. W. Tinsley, Chicago.—p. 1076.
Modification of Titan Yellow Method for Determination of Small Amounts of Magnesium in Biologic Fluids. V. G. Haury, Philadelphia.—p. 1079.
Limits of Usefulness of Direct and Indirect Methods of Determining Venous Pressure in Man. H. K. Beecher and M. E. Cohen, Boston.—p. 1088.
Method for Collecting Blood for Gas Analysis. J. Adriani, New York.—p. 1094.
Improved Method for Preparation of Urease Paper. B. Klein, Brooklyn.—p. 1097.
Determination of Sulfanilamide in Blood. J. Kamlet, Brooklyn.—p. 1101.

Excretion of Alcohol in Saliva.—Friedemann and his collaborators devised a simple and reliable procedure for the collection of mixed saliva. In addition to simple diffusion, other factors probably also affect the concentration of alcohol in saliva. However, the relatively slight differences which they found in the concentration of alcohol in human blood and saliva do not prevent its application for physiologic study and for medicolegal purposes. The mouth is rinsed thoroughly several times; at least five minutes should elapse before the saliva is collected, during which time a small square of petrolatum is chewed. About 5 cc. or more, if possible, of saliva is collected in a small test tube (18 by 200 mm.) which is provided with a tightly fitting stopper. The tube should contain approximately 10 mg. of sodium fluoride to preserve the sample. For best results the sample should be kept in the refrigerator and all analyses should be made within twenty-four hours. For collection of subsequent samples it is not necessary for the subject to rinse the mouth, unless alcohol has been taken in the intervening period. For determining the alcohol content of the body, 1 cc. of saliva is transferred to a 300 cc. Kjeldahl flask. The pipet is allowed to empty slowly, since saliva is viscous. The distillation and final oxidation are then carried out by the method of Friedemann and Klaas. Samples of 1 cc. of blood and urine were similarly analyzed and compared. It was found that the concentration of alcohol in mixed saliva more closely approaches that of venous blood than does the concentration of alcohol in the urine. For this and for technical reasons the use of saliva is proposed for medicolegal purposes.

Detecting Subclinical Scurvy.—Of the single determinations for detecting and grading subclinical scurvy the blood assay, Sloan believes, is the most informative but the saturation tests yield more precise and quantitative information. The added difficulties of the latter preclude their use in routine work, while the simple blood examination is one easily adaptable to hospital routine. For thorough study of the vitamin C reserves and rate of consumption the saturation tests, and particularly the blood curve, are more satisfactory. It is probable that these procedures will supplant the capillary resistance test because of their greater dependability. The capillary resistance test is the simplest procedure and it may be tested at the bedside, but its greatest drawback in adults in the present study was the occurrence of falsely negative results due to severe anemia. The most precise and dependable method of determining the degree of saturation of vitamin C is the determination of the rate of absorption of an injected dose from the blood stream. The rate of excretion of a test dose is less precise but quite dependable.

Superimposed Infection in Rheumatic Heart Disease.—Subacute bacterial endocarditis has generally been considered a superimposed infection when it occurs in cases of rheumatic cardiac disease. Pending the elucidation of the bacteriology of rheumatic fever, the term "superimposed" infection must be used with the reservation required by the allergic hypothesis. Subacute bacterial endocarditis is not the only superimposed infection found in rheumatic cardiac disease nor is it the most frequent. In a series of thirty cases selected as representative of rheumatic cardiac disease, Friedman and Lisa found evidence of superimposed infection in the heart in twenty-two cases. Of these, only one presented the clinical course of subacute bacterial endocarditis. The others included acute bacterial endocarditis, septicemia, erysipelas, pneumonia and peritonitis. In most of these cases, acute inflammatory, nonrheumatic lesions were found in the myocardium. In many also there was acute endocarditis which was neither bacterial nor rheumatic. Its frequent association with acute nonrheumatic myocarditis suggests that these endocarditides should be included as one of the cardiac sequelae of superimposed infection.

Journal of Pharmacology & Exper. Therap., Baltimore

63: 99-214 (June) 1938

Phenol Contaminated Waters and Their Physiologic Action. V. G. Heller and L. Pursell, Stillwater, Okla.—p. 99.
Comparative Study of Effects of Barbiturates, Ether and Bulbocapnine on Micturition. L. C. Kolb and O. R. Langworthy, Baltimore.—p. 108.
Comparative Study of Various Agents in Chemotherapy of Rat Trichomoniasis. Phyllis M. Nelson and A. L. Tatum, Madison, Wis.—p. 122.
Initial Depression of Heart Rate in Response to Epinephrine in Human Subjects. R. T. Fuchs, Worcester, Mass.—p. 143.
Experimental Carbon Tetrachloride Poisoning in the Cat: I. Influence of Calcium Administration. A. Cantarow, H. L. Stewart and D. R. Morgan, Philadelphia.—p. 153.
Study of Fibrin Factor in Its Relation to Subacute Endocarditis. M. Friedman, Chicago.—p. 173.
Hypnotic Properties of Some Derivatives of Trihalogenated Alcohols. R. R. Burtner and G. Lehmann, Louisville, Ky.—p. 183.
Cardiac Arrhythmia, Characteristic Effect of Thiobarbiturates, (Pentothal, Thiopentobarbital and Thicthamyl) as Influenced by Changes in Arterial Blood Pressure. C. M. Gruber, V. G. Haury and C. M. Gruber Jr., Philadelphia.—p. 193.

Maine Medical Journal, Portland

29: 135-160 (July) 1938

Endometriosis and Endometrioma: President's Address. R. W. Wakefield, Bar Harbor.—p. 135.
Acute Lymphocytic Meningitis and Other Virus Diseases of the Central Nervous System. H. R. Viets, Boston.—p. 137.
Laurence-Moon-Biedl Syndrome: Report of Two Cases. L. A. Parrella, Lewiston.—p. 140.

Minnesota Medicine, St. Paul

21: 455-528 (July) 1938

*Poliomyelitis, with Special Reference to the Drinker Respirator Therapy. A. V. Stoesser and W. S. Sako, Minneapolis.—p. 455.
Syphilis in the Transient. P. A. O'Leary, Rochester.—p. 459.
Chorioepithelioma with Report of Case: Survey of Incidence in St. Paul Hospitals. C. W. Froats, St. Paul.—p. 463.
Spina Bifida Cystica of Pelvis: Diagnosis and Surgical Treatment. A. W. Adson, Rochester.—p. 468.
Carcinoma of Gallbladder. W. C. Carroll, St. Paul.—p. 476.
Recurrent "Tropical" Lymphangitis: Report of Case. R. C. Logefeil and R. A. Hoffman, Minneapolis.—p. 479.
Intestinal Obstruction Due to Calcified Mesenteric Glands. J. M. Culligan, St. Paul.—p. 482.
Bromides, Their Use and Abuse. G. R. Kamman, St. Paul.—p. 484.
Acute Pulmonary Edema Occurring During Pregnancy or Labor. F. J. Schatz, St. Cloud.—p. 491.
Hyperpyrexia in the Newborn: Report of Infant with 107 F. by Rectum at Age of Fifty-Three Hours. L. F. Richdorf and W. H. Ford, Minneapolis.—p. 496.

Poliomyelitis.—Seventy-nine cases of poliomyelitis were admitted to the University and Minneapolis General Hospitals from July 1 to Dec. 31, 1937, and of this number twenty-nine patients had some respiratory distress. Physicians tend to place all their patients with respiratory difficulty in the respirator. Stoesser and Sako feel that this is a poor pro-

cedure, as some patients are made worse while in the Drinker respirator. The most important problem is the careful selection of the patients for treatment. In cases in which there is a direct paralysis of the muscles of respiration innervated by the nerves from the dorsal and cervical spinal cord the patient cannot sleep, but when he is placed in the Drinker respirator the response is usually dramatic. The cyanosis disappears and the face assumes its natural color and expression. After the patient's breathing and the respirator become synchronous, he falls into a deep sleep which may last many hours. In bulbar disease in which there is involvement of the nuclei of the cranial nerves with apparent injury of the respiratory center, the patients usually do badly in the respirator. Nine of the authors' patients had pharyngeal paralysis with some interference in proper breathing. None were treated in the Drinker respirator and all recovered. Two patients also had facial paralysis, and this cleared up satisfactorily. There were, however, six cases of the bulbar type with definite respiratory difficulty. Two patients were placed in the Drinker respirator but they did poorly and died in a short time. It was apparent that the machine caused aspiration of material from the throat and at the same time overcame the reflex choking and coughing by which this material could be ejected. The remaining four patients were treated by elevating the bed to facilitate drainage, suction of secretion, postural drainage, fluids parenterally and transfusions. The progress in all but one was favorable. In bulbospinal cases if the paralysis of the pharynx is bilateral, as indicated by a total inability to swallow, the machine is ineffective. This was easily demonstrated by the fact that five of six bulbospinal patients were placed in the Drinker respirator and none survived. They all had a bilateral paralysis of the pharynx. The one patient who was not put in the Drinker respirator therapy was not gravely ill. There was only a partial involvement of the muscles of respiration and a unilateral pharyngeal paralysis. This patient recovered. In conclusion the respirator is effective in patients with spinal respiratory involvement. In the bulbar type of paralysis with glossopharyngeal and vagal involvement, the respirator often offers little help.

New England Journal of Medicine, Boston

218: 1033-1086 (June 23) 1938

*Treatment of Pneumococcic Meningitis: Study of Ten Cases Treated with Sulfanilamide Alone or in Various Combinations with Specific Antipneumococcus Serum and Complement, Including Six Recoveries. M. Finland, J. W. Brown and A. E. Raub, Boston.—p. 1033.
Operative Mortality of Cholecystitis. P. L. Boyd, Boston.—p. 1045.
*Failure of Nicotinic Acid in Treatment of Anemia. O. C. Hansen-Pruss, Durham, N. C.—p. 1050.

Pneumococcic Meningitis.—Of the ninety-nine patients with pneumococcic meningitis seen at the Boston City Hospital between November 1929 and June 1936, none recovered except six of the ten whom Finland and his co-workers treated with sulfanilamide alone or with serum. The procedure adopted was as follows: 1. Complete and frequent drainage of the spinal fluid was carried out. 2. Continuous large doses of sulfanilamide by mouth or by subcutaneous injection, if necessary, were used immediately. The optimal dose has not been determined. Sodium bicarbonate was given with each dose. 3. The pneumococcus was identified as rapidly as possible and sufficient specific antipneumococcus serum was given intravenously to establish a balance of antibody in the circulating blood. 4. To insure adequate amounts of spinal fluid for drainage, the fluid intake was moderate. 5. About two hours after a reasonable dose was given, blood was withdrawn from the patient and the serum was separated. 6. Following the removal of spinal fluid, at the time of the next lumbar puncture, this serum was given intraspinally (from 5 to 10 cc.). This procedure may be repeated after subsequent lumbar punctures, if necessary. 7. Lumbar punctures were repeated until the fluid was normal. The frequency was determined by the initial pressure of the fluid and its cellular and protein contents. 8. Transfusions were given after the first week of sulfanilamide therapy if anemia developed and were repeated, as necessary, until the drug was discontinued (after from seven to fourteen days of sterile fluids). These procedures serve to ensure a balance of antibody in the blood stream and to control the bacteremia. They should, in most instances in which the sulfanilamide effectively reduces the infection, provide an adequate amount of antibody and complement in the optimal proportions and in a medium which is likely to give the least local or general reaction and the greatest antibacterial effect. A summary of the case histories and laboratory studies is given.

Nicotinic Acid in Anemia.—Hansen-Pruss administered nicotinic acid (Eastman) to three patients with pernicious anemia, one with hyperchromic anemia and liver disease, one with idiopathic hypochromic anemia and two with myeloid leukemeia. Each of the seven patients was given 60 mg. of nicotinic acid daily, by intramuscular or by intravenous injection. In two cases an evanescent flushing and subjective feeling of warmth followed the first of several injections. No other reactions were observed. In addition to frequent peripheral blood counts, cell counts were done directly on material aspirated from the sternal bone marrow. The nicotinic acid had no antianemic value in the seven instances. The only hematologic change observed was a temporary depression of myeloid function, as indicated by a drop in the leukocyte count of the bone marrow. This fall was not mirrored in the leukocyte count or in the Schilling hemogram of the peripheral blood. Nicotinic acid apparently had no effect on the platelet count. Thrombopenia in the cases of Addison-Biermer anemia, when present, persisted until treatment with liver was instituted.

New Orleans Medical and Surgical Journal

91: 1-56 (July) 1938

Did Clinical Specialization Anticipate Scientific Medicine? The Annual Oration. E. H. Cary, Dallas, Texas.—p. 1.
Necessity for Public Cooperation in the Control of Venereal Disease. W. A. Reed, New Orleans.—p. 7.
Present Status of Venereal Disease Control in Louisiana. J. A. Coleman, New Orleans.—p. 10.
Diagnosis and Treatment of Gonorrhea. E. Burns, New Orleans.—p. 12.
Complications to Antisyphilitic Therapy. J. K. Howles, New Orleans.—p. 15.
Radiation Technic in Carcinoma of Uterus. S. C. Barrow, Shreveport, La.—p. 19.
Treatment by Roentgen Ray of Conditions Other Than Cancer: The Manner of Application. H. O. Barker, Alexandria, La.—p. 24.
Primary Ovarian Pregnancy: Case Report. J. E. Isaacson, New Orleans.—p. 27.
Pathology of Certain Unusual Ovarian Tumors. H. J. Schattenberg, New Orleans.—p. 29.

Pennsylvania Medical Journal, Harrisburg

41: 777-878 (June) 1938

Some Features of Biology of Syphilitic Infection. T. B. Turner, Baltimore.—p. 777.
Acute Gonorrheal Posterior Urethritis. R. C. Hibbs, Pittsburgh.—p. 782.
Sarcoma in Rats Resulting from Ingestion of Crude Wheat Germ Oil Made by Ether Extraction. L. G. Rowntree, A. Steinberg, G. M. Dorrance and E. F. Ciccone, Philadelphia.—p. 784.
Carcinoma of the Colon, with Especial Reference to the Rural Patient. H. L. Foss, Danville.—p. 788.
When Is an Acute Abdomen Not an Acute Surgical Abdomen? J. O. Bower, Philadelphia.—p. 792.
Convulsive Disorders. W. Shapera, Pittsburgh.—p. 797.
Pathogenesis of Convulsive Disorders. Mona Spiegel-Adolf and E. A. Spiegel, Philadelphia.—p. 802.
Urinary Stasis as Related to Kidney Pelvis and Ureter. W. W. Wightman, Pittsburgh.—p. 803.
Principles of Proctologic Surgery. H. Z. Hibshman, Philadelphia.—p. 811.

Public Health Reports, Washington, D. C.

53: 1003-1064 (June 24) 1938

*Studies on Epidemiology of Poliomyelitis. C. C. Dauer.—p. 1003.
Studies on Dental Caries: IV. Tooth Mortality in Elementary School Children. J. W. Knutson and H. Klein.—p. 1021.
Study of Pseudotuberculosis Rodentium Recovered from a Rat. V. H. Haas.—p. 1033.

Epidemiology of Poliomyelitis.—Dauer gives information on the prevalence of poliomyelitis in the United States since 1916, reviews the epidemiology of the disease as it was presented in 1916 and its developments during the succeeding twenty years, and presents in detail the distribution of the disease by counties from 1933 to 1937 inclusive. A study of case fatality rates disclosed the fact that there were wide fluctuations from year to year in some states, suggesting that cases were well reported in epidemic years and poorly reported in the intervals between epidemics. In other states case fatality

and metrazol. Convulsions were readily induced by quantities of the compound ranging from 0.7 to 2.5 cc. given intravenously. The majority of patients require between 1.2 and 1.8 cc. The type of convulsion produced is, with correct dosage, the full major epileptic fit. The excretion of triazol appears to be somewhat slower than that of metrazol; consequently the injection need not be given with any special rapidity, though the smallness of the dose makes it easy to do so. Should the amount given fail to induce a fit, a supplementary dose of from one-third to one-half the original dose is sufficient to bring on the fit if given up to two minutes after the original injection. Sclerosis of the veins has not occurred in any case. When given intramuscularly, approximately twice the intravenous dose is required, though there are individual variations and it is best to begin with a somewhat smaller dose. After the fit, recovery is usually rapid, but there may be a short period of restlessness, as with metrazol. Routine premedication with $\frac{1}{100}$ grain (0.00065 Gm.) of atropine, given one hour before the treatment, completely abolishes vomiting. Amnesia for the effect of the drug appears to be more complete than with metrazol.

Medical Journal of Australia, Sydney

1: 985-1042 (June 11) 1938

Anesthesia in Pulmonary Tuberculosis. G. Brown.—p. 985.
Experiences with "Pentothal Sodium." G. Brown and G. Troup.—p. 989.
Cyclopropane Anesthesia. S. V. Marshall and H. J. Daly.—p. 990.

1: 1043-1076 (June 18) 1938

Spinal Arachnoiditis. E. G. Robertson.—p. 1043.
The Infant Hercules Type of Adrenogenital Syndrome. L. Dods and R. Jeremy.—p. 1047.
Method of Instilling Zinc Sulfate Solutions in Anterior Poliomyelitis. E. Gotteridge.—p. 1050.
Results of Investigation of Reflex Epilepsy. I. M. Allen.—p. 1052.
The Unsatisfactory Child. L. Male.—p. 1055.
Persistent Benign Meningococcic Bacteremia: Report of Case. C. G. Lambie.—p. 1058.

South African Medical Journal, Cape Town

12: 381-416 (June 11) 1938

Treatment of Patients Before and After Operation. P. R. Michael.—p. 383.
Electrical Aids for Hearing. F. G. Cawston.—p. 387.
Transplantation of Ureters in Gynecologic Practice. P. Connan.—p. 389.

Kitasato Archives of Experimental Medicine, Tokyo

15: 101-198 (April) 1938

*Treatment of Epidemic Encephalitis by Intraspinal Injection of Normal Serum. T. So.—p. 101.
Summary of Experimental Studies on Bacterial Control in Etiology of Dental Caries. T. Okumura.—p. 124.
Filtration Experiments of Virus of Endemic Typhus. S. Kasahara, S. Yoshida and Y. Okamoto.—p. 143.
Serologic Grouping and Typing of Hemolytic Streptococci Isolated in Tokyo: II. T. Kodama, M. Ozaki, S. Nishiyama and Y. Chiku.—p. 162.
Experimental Studies on Animals Concerning Leprosy, Report IX: Inoculation Tests with Human Leprosy, Part II. Y. Watanabe.—p. 179.

Treatment of Epidemic Encephalitis by Normal Serum.—Eleven patients with epidemic encephalitis were treated by So with serum of normal persons intraspinally. Serums were obtained from four healthy members of the patients' families and three normal men in the laboratory. These serums were not inactivated nor was a disinfectant added. Serums were never used if they were older than three days. The serums were kept in the ice box. The quantity of serum used was from 3 to 8 cc., and it was introduced slowly into the spinal cavity by lumbar puncture. Before the serum was administered a narcotic was injected, as the injection of the serum occasionally caused temporary stimulating symptoms. The most remarkable thing about the treatment is the prompt lowering of the temperature of the body (from several hours to twenty-four hours) and the rapid recovery of consciousness. A larger quantity of serum appears to be more effective than a smaller dose, especially in severe cases. Even in advanced cases the administration of normal serum produces a rapid fall of temperature. There appeared to be no difference in the effectiveness of the serum, whether it was taken from blood relatives or otherwise.

Annales de Dermatologie et de Syphiligraphie, Paris

9: 465-544 (June) 1938

*Cholesterolemia in Psoriasis. J. Gaté, G. Chanial, A. Vallet and P. Humbert.—p. 465.
Production of Artificial Argyria in Animals. J. Lenartowicz and B. Jalowy.—p. 483.
Traumatic Marginal Alopecia. H. Ribeiro.—p. 495.

Cholesterolemia in Psoriasis.—Gaté and his associates conducted investigations in order to verify the theory according to which disturbances in the lipoid metabolism are the cause of psoriasis. They first cite the different clinical factors that have been advanced in favor of this theory, such as that most patients with psoriasis are well nourished, that the incidence of psoriasis decreased in Germany during the war when the fat content of the diet was low, and that the scales of psoriasis have an abnormally high fat content. Further, they cite biochemical and therapeutic factors in favor of this theory and mention authors who studied the cholesterol content of the blood and the therapeutic efficacy of diets with a low fat content. They studied the cholesterol content of the blood in thirty-six cases of psoriasis at the time of the severest stage of the eruption and also, when possible, after the attack. In some of their patients they employed a diet with a low fat content, but a strict enforcement proved difficult and so there were only a few rare cases in which they used this dietetic treatment to the exclusion of all others. They excluded all foods with fat content of more than 30 per cent and included only limited quantities of the foods with a fat content between 3 and 12 per cent. They give a list of the foods that are prohibited and of the foods that are permitted. The diet made up of the latter foods was sufficiently varied and palatable. Contrary to the observations of other investigators, the loss of weight was slight in the authors' cases. The authors say that the cholesterol content of the blood was normal or below normal in 30 per cent of the cases, whereas in all other cases it was either above normal or at the upper limits of normality. Moreover, tests made during the time of improvement or cure revealed in the majority of cases a considerable reduction in the cholesterol content. However, there was one case in which a clinical amelioration was accompanied by a slight augmentation in the cholesterolemia. The therapeutic results of the fat deficient diet seem interesting in spite of their small number. The authors noted one failure, but in four other cases they obtained a considerable amelioration either with the diet alone or together with local treatments. They think that the dietetic treatment is indicated in association with the customary treatments, not only in order to promote their action, but especially in order to prevent recurrences.

Bruxelles-Médical, Brussels

18: 1119-1155 (June 26) 1938

Leprosy in Brazil and Its Prophylaxis. H. C. De Souza-Araujo.—p. 1119.
*Treatment of Secondary Infectious Rheumatism by Azo and Nonazo Derivatives of Sulfanilamide. M. Ferond.—p. 1125.

Treatment of Rheumatism by Derivatives of Sulfanilamide.—Secondary infectious rheumatism, according to Ferond, develops in the course of an infection and involves a lesser number of articulations than does acute rheumatism. The articular swellings are usually less mobile than in Bouillaud's disease and subside less readily. Ankylosis and considerable deformities and tendinous retractions and even suppuration occur more frequently. The capsules and periarticular bursae are always involved. Sometimes they are alone involved and the articulation proper is unimpaired. In the majority of cases of secondary infectious rheumatism it is the actual presence of the infectious organism in situ which produces the articular manifestations. The treatment with salicylate has little or no effect in this form of rheumatism. Articular puncture often permits the detection of streptococci, staphylococci, pneumococci, gonococci and so on. From the immense group of secondary infectious rheumatism some forms stand out because of their frequency, because they have been studied more thoroughly or because an efficacious treatment is available for them. In this connection the author cites gonorrheal rheumatism, acute syphilitic rheumatism and the rheumatisms that develop after scarlet fever, erysipelas, puerperal infection, pneumonia, typhoid, influ-

enza and cerebrospinal meningitis. Until recent years the medicinal treatment was not effective against the majority of the micro-organisms responsible for the aforementioned forms of secondary infectious rheumatism, but the discovery and the therapeutic employment of a series of chemical derivatives that are efficacious against gonococci, staphylococci, streptococci, pneumococci, meningococci and others seem to make possible pratically a specific chemotherapy of a large number of cases of secondary infectious rheumatism. The author gives the formulas of the new preparations, cites their action on different pathogenic organisms and discusses their experimental toxicity and their absorption, elimination and mode of action. In evaluating their clinical activity and their therapeutic value in acute secondary infectious rheumatism he emphasizes that these medicaments occasionally seem to give rise to complications. However, he thinks that these substances, when employed promptly in the treatment of secondary infectious rheumatism, will prove valuable in preventing late complications.

Presse Médicale, Paris

46: 969-983 (June 22) 1938

Arterial Hypertension by Renal Ischemia. Pasteur Vallery-Radot, S. Blondin, R. Israel and C. Cachin.—p. 969.
*Pyretotherapy of Pure Lipoid Nephrosis. R. Clément.—p. 971.
Mental Aspects of Acute Syphilitic Meningitis. A. Donnadieu.—p. 974.
Cold Abscess of the Thyroid Gland. A. Uraz.—p. 977.

Pyretotherapy of Lipoid Nephrosis.—Clément says that several observers have noticed that, instead of becoming exacerbated by intercurrent febrile diseases, lipoid nephrosis frequently is improved by them. He was able to collect thirty-nine cases in which an existing lipoid nephrosis was improved after an intercurrent febrile disease. The appearance of the fever is often accompanied at first by an exacerbation of the clinical symptoms such as reduction in the urinary output and augmentation of the albuminuria, of the edemas and of the serous effusions. After that the paradoxical clinical amelioration appears: diuresis sets in; the albuminuria decreases rapidly and may disappear; the edemas and the effusions become absorbed, and the general condition improves. The diseases that have had a favorable effect on the development of lipoid nephrosis vary greatly. The only factor they have in common is that they produce a high fever for a period of several days. In the material investigated by the author, measles, either alone or combined with other febrile disorders, was the most frequent. Other febrile disorders that were found to influence lipoid nephrosis were various types of pneumonia, bronchitis, rhinopharyngitis, peritonitis, erysipelas, otomastoiditis sinusitis, typhoid and so on. The favorable effect exerted by such intercurrent febrile diseases on the evolution of lipoid nephrosis has led to trials with pyretotherapy. The author tried this treatment first in 1936, but subsequent bibliographic investigations revealed to him that others had tried it as early as 1931 and 1933. He gives a detailed clinical history of a boy, aged 15, who had a typical lipoid nephrosis and in whom pyretotherapy produced a clinical and humoral cure which so far has persisted for eighteen months. The attacks of fever were elicited at first by injections of sulfurated oil and later with an antityphoid vaccine. This and other cases corroborate the ameliorations produced in lipoid nephrosis by intercurrent febrile diseases. In summarizing the observations on lipoid nephrosis in the course of spontaneous or provoked fever, the author says that the existence of a nephritic element in lipoid nephrosis makes it necessary to be extremely reserved in the use of pyretotherapy. In several cases in which the urine contained casts and leukocytes and in which the blood showed a certain degree of azotemia, the intercurrent febrile disease did not have favorable effects on the lipoid nephrosis. The existence of these symptoms may be a contraindication to pyretotherapy. Moreover, even in pure lipoid nephrosis the disorders accompanying the hyperthermia must be taken into consideration. The daily injection of progressive doses may represent too much of a load for the diseased organism. On the other hand, a short thermic attack provokes only a short phase of aggravation, which is followed by an improvement. It seems best to employ the induced fever discontinuously, at intervals of six or ten days, for example. The choice of the pyretogenic agent seems to be of little importance. The use of milk, casein, sulfur preparations, bacterial vaccines and physical therapeutic procedures have all been known to be followed by success as well as by failure. The results obtained are not exactly in proportion to the height of the fever. Nevertheless it seems necessary that the thermic attack be of considerable intensity. The action mechanism of the fever is still hypothetic. The author hopes that pyretotherapy will greatly improve the prognosis of lipoid nephrosis.

46: 985-1032 (June 25) 1938. Partial Index

Morphology of Hyphomycosis of Feet. T. de Verebély.—p. 989.
Thyroid Gland and Pernicious Anemia. G. Mansfeld.—p. 993.
*Therapeutic Properties of Vitamins. A. Szent-Györgyi.—p. 995.
New Experimental Researches on Obesity. A. de Beznak.—p. 996.
Lichen Moniliformis. L. Nékam.—p. 1000.
"Whooping Cough Lung" and Its Radiologic Aspects. R. Debré, M. Lamy, M. Mignon and J.-J. Welti.—p. 1011.
*Histologic Lesions of Gonococcic Arthritis. H. Mondor and Mlle. Gauthier-Villars.—p. 1015.
Granulocellular Rhabdomyoma of Tongue. J. Ducuing and Bassal.—p. 1018.

Therapeutic Properties of Vitamins.—Szent-Györgyi shows that certain misconceptions exist with regard to the vitamin C requirements of the organism. Zilva, he says, in experiments on guinea-pigs, detected that from 1.5 to 2 mg. of vitamin C maintains the guinea pig in an apparently healthy state but that a quantity about ten times greater is required to saturate the organism of the animal with vitamin C. Zilva thinks that this enormous quantity of vitamin C is entirely unnecessary, since with about 2 mg. of vitamin C the guinea pigs seem to be in perfect health. To this opinion Szent-Györgyi raises the objection that guinea pigs living in cages cannot be compared with those living in their natural habitat. He admits that 20 mg. of vitamin C seems an enormous amount but shows that guinea pigs which live in their natural surroundings in the tropics ingest approximately that amount with their daily food. He is of the opinion that the quantity of vitamin C which protects the organism against scurvy is not necessarily sufficient, because scurvy is not the first sign of vitamin C deficiency but rather a premortal, late symptom. A slight vitamin C deficiency causes no definite symptoms, so that the organism appears healthy. Man living under conditions provided under civilization is subject to a partial vitamin deficiency. This partial avitaminosis and the diminution of the power of resistance, which it involves, may lead to various disorders. On the other hand, vitamin C seems to produce favorable results in febrile diseases, during which the organism's requirements for vitamin C seem to grow. In this connection the author suggests that if diseases like pneumonia and nephritis are favorably influenced or even cured by vitamin C, it appears likely that they might have been prevented if the patient had absorbed the required amount of vitamin C.

Histologic Lesions of Gonococcic Arthritis.—Mondor and Gauthier-Villars, after reviewing the results which they obtained in biopsies in cases of gonococcic arthritis in the years 1926 and 1928, cite observations by other investigators. Since 1928 their biopsy material has greatly increased, so that now it includes forty-eight synovial biopsies (articular and tendinous), fifteen osseous biopsies on the articular surfaces and twenty-one calcaneal sections. Before evaluating the observations on this material, the authors raise the question whether the observed reactions are elicited only by the organism in question or whether they are determined also by the tissues in which they evolve. Since in the cases of arthritis treated by arthrotomy biopsy is still not widely practiced, the authors lack sufficient material for comparison with other forms of arthritis. Moreover, in the same patient it is possible to evaluate the impairment of the synovial membrane, of the bone, of the periosteum, of the cartilage and of the periarticular tissues only relative to the resected pieces, which do not often represent stabilized forms. Finally, the age of the lesions must be taken into consideration. In evaluating their histologic observations, the authors first discuss twenty-two synovial biopsies which they made within the first two months of the existence of the disease. In eighteen of these twenty-two cases they were able to detect gonococci in the sections, whereas this was possible in only one of the twenty-six cases in which the process was older. In attempting to draw general conclusions from their histologic observations, the authors say that they were unable to find lesions that were

frankly specific for gonococcic arthritis. They think that it is impossible to base a definite etiologic diagnosis on the inspection of histologic sections, but the absence of necrosis, the precocity of the organization of the lesions and the richness of the inflammatory exudates in plasmocytes appear to them as suggestive of a gonococcic process. However, they believe that on the basis of twelve years of observation they are justified in affirming that the synovial membrane is the point of predilection of the lesions of acute arthritis; it shelters the gonococcus even in the cases in which the periarticular phenomenon seems to be the most active. Gonococci are detectable in eight out of ten cases if the examination is made during the first eight weeks. The bone is always more or less involved in the course of acute arthritis, and the term acute osteo-arthritis, which has been suggested by the authors, corresponds to an anatomic reality. Pathologic dislocations are frequent; there are osseous as well as capsular lesions which cause them. The anatomic changes that are the basis of the gonorrheal talalgias consist in a diffuse calcaneal osteoperiostitis, which far exceeds the roentgenologically visible exostosis.

Schweizerische medizinische Wochenschrift, Basel

68: 753-776 (July 2) 1938. Partial Index

Remarks on Last Year's Epidemic of Poliomyelitis in Basel. E. Wieland.—p. 753.
Formerly Unknown Hereditary Disease of Eyes (Hereditary Hyaloid Degeneration of Retina). H. Wagner.—p. 761.
*Influence of Hypnosis on Pulse: Apparatus for Automatic Uninterrupted Registration of Blood Pressure. B. Stokvis.—p. 764.
Silent Early Period of Syphilis. K. Wolpert.—p. 767.

Influence of Hypnosis on Pulse.—Stokvis says that in considering the influence of hypnosis on the pulse action it is necessary to differentiate between the influence of the hypnosis as such and that which is exerted by the nature of the hypnotic suggestions. In order to determine the influence of hypnosis on the pulse, he subjected ten healthy persons and ten persons with essential hypertension repeatedly to hypnosis. The figures given in the tables reporting the results are the mean averages of repeated tests. The feeling of the pulse, which is a disturbing factor in hypnosis, was unnecessary, because the tensograph was used. This is an apparatus for the continuous automatic registration of the systolic and diastolic blood pressure which indicates every pulse beat by a ticking sound. Discussing the influence of hypnosis as such, the author says that in healthy persons the pulse frequency decreases under the influence of hypnosis as such. The same statement applies *mutatis mutandis* to persons with hypertension. In normal persons the suggestion of rest under hypnosis usually causes a greater decrease in the pulse frequency than does hypnosis as such. The change in the pulse frequency is greatest if fear is suggested and least if joy is suggested. The suggestions during hypnosis of anger, pain and work have approximately the same effect on the pulse frequency. In patients with hypertension it is the same as in normal persons. The fact that during the hypnotic state as such the pulse frequency usually decreases is in accordance with the fact that the systolic pressure, which is dependent on the cardiac activity, decreases more during hypnosis than does the diastolic pressure, which is influenced chiefly by the tonus of the vascular wall. If cardiac palpitation is suggested during the hypnotic state, neither the blood pressure nor the pulse frequency is changed. Thus it is impossible to increase the pulse frequency by the direct suggestion of an abnormal cardiac activity; to accomplish this, an emotional stimulus is required which influences the nervous system of the vessels.

Gazzetta degli Ospedali e delle Cliniche, Milan

59: 529-556 (May 22) 1938

Splenectomy in Leukemia. A. Ferrata and A. Fieschi.—p. 531.
Correlative Behavior of Respiration, Pulse, Arterial Pressure and Morphologic Elements of Blood After Administration of Insulin. E. Frola.—p. 534.
*Electrocardiographic and Morphologic Researches for Right or Left Localization of Ventricular Myocardial Lesions. F. Kienle.—p. 543.

Localization of Myocardial Lesions.—Kienle states that lowering of the ST segment of the electrocardiogram taken at the extremities at the first or second derivation indicates predominant lesions of the left ventricle, whereas the same phenomenon in the electrocardiograms taken in the second and third derivations shows predominant lesions of the right ventricle. His statement is supported by the results of macroscopic and microscopic studies of the heart of several patients who showed these electrocardiographic alterations for some months before death. Necropsy confirmed the diagnosis as to the presence of myocardial lesions at either the right or the left ventricle in all cases. In a case of subacute pulmonary embolism there was a lowering of the ST segment of the electrocardiogram in the third derivation. The curve was similar to that of infarct of the posterior wall. A large number of foci of necrosis of the right ventricle could be seen on microscopic study of the heart.

Ginecologia, Turin

4: 333-402 (June) 1938. Partial Index

Oxalemia and Average Amount of Oxalic Acid in Human Placenta in Relation to Exogenous Factor Administered at End of Normal Pregnancy. F. Rigazzi.—p. 333.
*Spinal Anesthesia in Cesarean Section. A. Duca.—p. 364.
Morphologic Modifications of Blood After Epinephrine Injection in Pregnancy and Puerperium. T. M. Caffaratto.—p. 378.

Spinal Anesthesia in Cesarean Section.—Duca points out the advantages of lumbar anesthesia in making a cesarean section. Cesarean section was indicated in seventy-five of eighty-six cases because of abnormalities of the pelvis. The remaining cases were of early rupture of the membranes, detachment of placenta normally inserted, central placenta praevia and eclampsia. Forty-nine patients were primiparas. The author administered 3 cc. of a 5 per cent solution of procaine hydrochloride with some epinephrine. The amount of spinal fluid removed was about 4 or 5 cc., and more than that but less than 10 cc. was removed in cases of increased pressure of the fluid. Lumbar anesthesia offers no danger or after-effects. The contraindications are large hemorrhages, acute shock, decompensated heart diseases, acute toxemia, hypotension in intestinal obstruction and septicemia with positive blood cultures. Lumbar anesthesia has various advantages, especially the speed of inducing it in about ten minutes without any previous preparation of the patient, the complete insensibility of the lower half of the body, relaxation of the abdominal muscles, lack of nausea and other abdominal disorders, and especially the hemostatic conditions of the operative field. The author reviews the theories of the enervation of the uterus and states that spinal anesthesia induces an energetic contraction of the uterus with consequent hemostasis during cesarean section.

Radiologia Medica, Milan

25: 495-582 (June) 1938

Technic and Roentgen Anatomy of Temporal Pyramid. G. Bignami.—p. 495.
*Roentgen Study of Spontaneous Fractures of Ribs in Pulmonary Tuberculosis. C. Sabbione.—p. 528.
Functional Factors in Roentgen Aspects of Normal Lung. A. Salotti.—p. 541.
Roentgen and Radium Therapy of Laryngeal Papilloma. E. Rosti.—p. 547.

Spontaneous Fractures of Ribs in Pulmonary Tuberculosis.—After examining the roentgenograms of the thorax in a group of 4,570 adult patients of both sexes who were suffering from pulmonary tuberculosis, Sabbione found spontaneous fractures of the ribs in nineteen. There was no history of trauma. The fracture was caused by coughing or sneezing. According to the author, spontaneous fractures of the ribs in the course of pulmonary tuberculosis are rare. They take place in adults over 40 or 50 years of age who are suffering from grave forms of pulmonary tuberculosis. The condition is more frequent in women than in men and takes place in either side. It is caused by osteoporotic atrophy which develops in the course of pulmonary tuberculosis from insufficient fixation of calcium by the bones. The diagnosis is made from the type of pain which is constant and intensified by coughing, sneezing and pressing of the rib during palpation. The fracture shows in the roentgenograms from fifteen to twenty days after it takes place, with the typical aspect of callus. Spontaneous fractures of the rib evolute as fractures of any other type, with complete healing

in two or three months. They seem to have a prognostic significance. In all the cases seen by the author the general and pulmonary conditions rapidly grew worse after the occurrence of the fracture.

Semana Médica, Buenos Aires

45: 1401-1456 (June 23) 1938. Partial Index

Tuberculosis of Knee Joint: Chutro's Synovectomy. R. L. Ferré, P. Esperne and J. L. Curutchet.—p. 1401.
*Posttraumatic Parkinsonism. S. Chichilnisky.—p. 1420.
Factors of Success or Failure of Peridural Anesthesia. E. S. Sammartino.—p. 1429.

Posttraumatic Parkinsonism.—Chichilnisky discusses the etiologic role of cranial trauma in parkinsonism and reviews the literature on the subject. According to the author the existence of posttraumatic parkinsonism is proved. The diagnosis is made after verification of the following conditions: absence of any history of the patient having had encephalitis, presence of violent cranial trauma and, generally, of a period of incubation of the disease, progressive uninterrupted evolution of the disease without appearance of mental symptoms and a constitutional predisposition. Loss of consciousness is not necessary in cerebral concussion which may be demonstrated by other symptoms of shock. The period of incubation between trauma and first appearance of the symptoms generally varies from eight to ten months. In rare cases it may be either longer or nonexistent. The disease develops without any remission. The syndrome is caused by hemorrhagic lesions either at the optostriate nuclei or at the cortex of the frontal lobe. There is an evident correlation between posttraumatic parkinsonism and Pierre Marie's syndrome. The two syndromes generally coexist. From a medicolegal point of view the patients have a permanent total incapacity. Two cases are reported.

Chirurg, Berlin

10: 377-408 (June 1) 1938

Arteriographic Demonstration of Vessels of Posterior Cranial Fossa. O. Sjöqvist.—p. 377.
Rare Form of Renal Adenoma. H. Meltzer.—p. 380.
*Recurrence of Gallstones. G. Zopff.—p. 389.
Results with Resection in Gastric Duodenal Ulcers. E. Kirnmann.—p. 397.

Recurrence of Gallstones.—According to Zopff, in the last three years 202 cholecystectomies were performed at the Heidelberg clinic. During the same period forty-five (18.5 per cent) patients were readmitted to the clinic because of recurrence of symptoms. The original operation was performed from six months to twelve years before. Only eleven had their original operation at the Heidelberg clinic. On reoperation a stone was found to be present in the extrahepatic bile passages in twenty-three (51 per cent), or 9.3 per cent of the total number of patients operated on during the same period. Inflammatory alterations were responsible for the symptoms in eleven (24.5 per cent). Eight patients presented mechanical disturbances either in the biliary tract or in the intestine. Dyskinesia was assumed to be the cause in three (6.7 per cent). Enlargement of the periportal lymph nodes was found to be the cause in two cases. Carcinoma at the hilus of the liver was observed in one. There were three types of inflammatory alterations: those of the bile passages, late abscesses, and inflammation of the head of the pancreas. The patients in whom the symptoms were due to inflammation of the bile passages responded well to conservative treatment, which consisted of the passage of the duodenal sound and flushing with 40 per cent magnesium sulfate. There were four instances of late abscesses which had developed in cases of neglected cholangitis. More than 50 per cent of recurrences were due to a stone. The author believes that most of the recurring stones are those overlooked at the time of the original operation, although he does not reject the possibility of formation of new stones in the extrahepatic bile passages. In proof of the latter contention, the author cites three cases in which stones were removed from the common bile duct and in which there was congenital absence of the gallbladder. The author likewise had seen two consecutive recurrences of stones in the common bile duct. He stresses Enderlen's advocacy of an early operation for gallstones. The stones may lie a long time in the common duct without producing symptoms, though they prepare the ground for a recurrence after a cholecystectomy. Among 202 cholecystectomies, stones were removed from the bile passages in twenty-eight cases (13.9 per cent). Because of a definite increase in mortality when the choledochus is opened, roentgenologic investigation of the patency of the duct during the operation, as proposed by Mirrizzi, was adopted in the Heidelberg clinic. In addition, they have attempted to locate the stone by transillumination of the duct. The favorite seat of a recurring stone is the physiologic enlargement of the duct just above the sphincter of Oddi, giving rise to symptoms of a valve stone with or without involvement of the pancreas. The diagnosis of the presence of a stone in the common duct constitutes an indication for operation. Choledochotomy and the removal of the stone were considered sufficient in the presence of a patent duct. Drainage was practiced only in the presence of severe inflammation, icterus and white bile. The author considers systematic medical after-treatment an important prophylactic measure in preventing recurrence of symptoms.

Klinische Wochenschrift, Berlin

17: 905-920 (June 25) 1938

*Vitamin B_1 Content of Blood and Urine and Its Changes in Hyperthyroidism and in Cancer Cachexia. E. Schneider and A. Burger.—p. 905.
Important Diagnostic Phenomenon for Recognition of Open Ductus Arteriosus Botalli. H. Bohn.—p. 907.
New Method for Exact Demonstration of Contrast Mediums Containing Iodine and for Obtaining Information About Their Fate in the Organism. W. Lutz and H. Seyfried.—p. 908.
*Rapid Bacteriologic Diagnosis of Diphtheria. W. Helmreich.—p. 910.
Hemoglobin Metabolism in Febrile Episodes of Schizophrenic Psychoses. K. F. Scheid.—p. 911.
Blood Picture During Ulion Therapy of Gonorrhea. H. Weber.—p. 915.
Carcinomatous Lymphangitis of Lungs. H. Hippe and K. Hähle.—p. 917.

Vitamin B_1 Content of Blood and Urine.—Of the three available methods for the quantitative determination of the vitamin B_1 content, Schneider and Burger used the thiochrome method of Jansen and the method of Prebluda and McCollum. They made tests on healthy persons, on patients with hyperthyroidism and on patients with cancer cachexia. They found that the daily elimination of vitamin B_1 in the urine of healthy persons fluctuates between 80 and 100 micrograms. The average vitamin B_1 content of the serum amounts to about 6.4 micrograms per hundred cubic centimeters. The percental urine value is slightly higher than the serum value and amounts to from 7 to 8 micrograms per hundred cubic centimeters. During hyperthyroidism the normal averages of the vitamin B_1 content may be doubled; that is, the vitamin B_1 elimination as well as the vitamin B_1 requirements run almost parallel to the increase in the metabolic rate, but it cannot be said that vitamin B_1 exerts an antagonistic action against the thyroid function. In patients with cancer, the increasing cachexia is accompanied by a decrease in the vitamin B_1 content as well as by an A and C hypovitaminosis. As the cachexia reaches severe degrees, the vitamin B_1 may completely disappear from the serum as well as from the urine. In this respect the behavior of vitamin B_1 is similar to that of vitamin C.

Bacteriologic Diagnosis of Diphtheria.—Helmreich points out that the Löffler serum as well as the indicator-tellurium plate of Clauberg, the two methods most widely used for the bacteriologic diagnosis of diphtheria, have the disadvantage that at least from eight to twelve hours and frequently more time is required for the diagnosis of diphtheria. It was the author's aim to develop a culture medium that would make possible a more rapid diagnosis. He cites the guiding principles that he followed in his search for the new medium and says that after hundreds of trials he found a fluid of the following composition the most suitable culture medium: 3 cc. of beef serum, 1 cc. of a 1 per cent bouillon of dextrose and 2 cc. of a 1 per cent solution of sodium acetate. The sterile cotton tampons are immersed for a short time in this mixture and are immediately put back into the test tube. The adhering serum is coagulated by heating for a period of thirty minutes in a water bath of 80 or 90 C. Testing the reliability of this method in seventy-nine cases, the author found that in sixty-

four the diagnosis could be definitely established after from two to three hours; in six others the diagnosis was established after from three to five hours, in five after from five to eight hours and in the remaining four after from eight to twelve hours. Comparative tests with the Clauberg and Löffler methods revealed that neither of these methods established the diagnosis before at least five to eight hours had elapsed, and in the majority of cases these methods required from eight to sixteen hours. He says that the fluid mixture can be stored on ice for six weeks and that the prepared swabs may be kept for about two weeks, provided they are properly sealed. The described method of rapid bacteriologic diagnosis is especially suitable for public health centers. In new cases of suspected diphtheria this method should be used together with the Clauberg and Löffler methods.

Münchener medizinische Wochenschrift, Munich

85: 1017-1056 (July 8) 1938. Partial Index

Evaluation of Right and Left Types in Electrocardiogram with Leads from Extremities. H. von Pein, P. Papageorgiou and L. Tölken.—p. 1017.
*Dangers of Intravenous Cholecystography. W. Lutz and H. Seyfried.—p. 1019.
Management of Placental Stage: How to Shorten It and Save Excessive Bleeding. G. Lehmann.—p. 1020.
*Clinical Aspects of Thallium Poisoning. G. Brumm.—p. 1024.
Bismuth Therapy of Angina and Tonsillitis. F. Imhof.—p. 1028.
"Athermic" Effects of Short Waves. E. Hasché.—p. 1033.
Evaluation of Efficacy of Immunization Against Diphtheria. K. Hofmeier.—p. 1035.

Dangers of Intravenous Cholecystography.—Lutz and Seyfried report the clinical history of a patient who died following the injection of the contrast medium for intravenous cholecystography. The necropsy corroborated the assumption that the sudden death was caused by an acute failure of the coronary circulation. Sclerotic changes were detected on the coronary vessels, but an acute thrombosis or an infarct did not exist. The contrast medium cannot be said to have been at fault, because ampules from the same package had been used about the same time without ill effects. Although there is no definite proof that the intravenous administration of the contrast medium caused the fatal outcome (sudden heart failure may occur in coronary sclerosis without external influences), it is nevertheless probable that the concurrence had a causal basis and that the diagnostic intervention was the eliciting factor. On the basis of this observation, the authors conclude that intravenous cholecystography is contraindicated not only in hypertension and in hypotension but also in all cases in which there is the slightest suspicion of coronary insufficiency or in which a coronary spasm threatens.

Thallium Poisoning.—Brumm says that, whereas reports about industrial and medicinal poisoning with thallium preparations have become rare, there is a noticeable increase of reports on poisonings resulting from the use of thallium preparations with homicidal or suicidal intentions. The preparation that is most frequently responsible in the latter type of cases is a paste which is marketed as a rat poison and which contains 2 per cent of thallium sulfate. The author describes his observations in a case of acute thallium poisoning. The patient, a man aged 24, attempted suicide by taking two tubes of the aforementioned rat poison, or approximately 1.4 Gm. of thallium sulfate. The case is noteworthy because the patient ingested almost the maximal dose of thallium sulfate and because he developed practically all the symptoms that are characteristic for thallium poisoning: nephritis, formication in the hands and feet, pains in the legs, acute abdominal pains, headaches, loss of appetite, insomnia, severe thirst, loss of hair, mental depression alternating with euphoria, hyperkeratoses on the hands and feet, white transverse streaks on the nails and so on. In the tenth week after the poisoning the physical condition had greatly improved, but when the patient again gave indications of suicidal intentions he was transferred for observation to the clinic for nervous disorders. Later he could be discharged as cured. Following a review of the literature on thallium poisoning, the author says that during the early stage the differential diagnosis must consider tabes or polyneuritis caused by arsenic, lead, mercury or alcohol. The diagnosis can be definitely decided by the demonstration of thallium in the urine or stool. Since the elimination of thallium is slow, this is possible even after weeks have elapsed since the poisoning. Discussing the treatment, the author says that injections of sodium thiosulfate have been recommended and that vitamin B_1 has been known to exert a favorable influence on the neuritic symptoms. In the reported case, both of these treatments were used. At first, three ampules of a vitamin B_1 preparation were given daily by intravenous injection. Later, smaller doses of it were given at longer intervals and by intramuscular injection. The intravenous injections of sodium thiosulfate (1 Gm. in 10 cc. of distilled water) were at first given daily, later twice weekly.

Hospitalstidende, Copenhagen

81: 293-320 (March 29) 1938

*Heredity of Human Blood Group Factors. V. Friedenreich.—p. 293.
Vitamin C Balance in Patients with Hematemesis and Melena. S. Lazarus.—p. 309.

Heredity of Human Blood Group Factors.—Friedenreich states that systematic quantitative studies of the absorption ability in a larger number of A persons showed two sharply defined groups, one with marked binding ability and one with weaker ability, which are identical with Landsteiner's A_1 and A_2. With Thomsen and Worsaae he showed that of the A_1 and A_2 characteristics each depends on its gene; A_1, like A_1 and B, dominates over O but is dominated by A_1. A_2 persons cannot have A_1 offspring except with an A_1 partner, while certain A_1 persons (genotypes A_1, A_2) may have A_2 offspring without an A_1 partner but cannot in such case have O children. Recently he has seen another, rare, A variety mainly characterized by reaction far weaker than that of A_2; in some of the persons with this reaction the A characteristics could not be established by means of the ordinary factory serums. He has examined the families in seven cases, about 300 persons in all. The inheritance of this characteristic, designated as A_3, is explained by the assumption of one more allelomorphic gene, which dominates over O but is recessive toward both A_1 and A_2. The complete system will thus comprise fifteen genotypes and eight phenotypes. An apparently parallel principle, the author asserts, occurs in the MN system. He cites Crome's case of deviation from the system and reports a personal case of M mother and N child. Repeated examination of the mother with selected serums, however, established a weak N reaction. She is consequently not a homozygot M but has an extraordinarily weak N factor, far beyond the hitherto known variation breadth of the N factor, and examination of the child's grandmother revealed a special hereditary variety. The genetic basis must be a special allelomorphic gene called N_2, analogous to A_2 in the ABO system and dominated by the usual N gene (called N_1). Repeated examination of the partner in the case cited has disclosed the N_2 factor in the mother. The frequency of the characteristic is not yet known. These uncommon factors have a practical significance in that they may escape establishment and so lead to erroneous type determination. He considers it reasonable to assume that these subtypes are the expression of a number of mutations in a relatively unstable gene, like the well known phenomena from the animal and plant kingdoms.

81: 549-576 (June 7) 1938

*Myelomatosis: Four Cases. H. E. Nielsen.—p. 549.
Perforation of Lung in Patients with Pulmonary Tuberculosis: Character of Exudate; Diagnosis by Analysis of Pneumothorax Air. H. Harpøth and U. Gad.—p. 561.

Myelomatosis.—Nielsen says that in four cases of myelomatosis, all diagnosed within nine months, the clinical picture was dominated by pains localized in the affected bones. Roentgen and laboratory examinations contributed to the diagnosis and sternal puncture revealed the characteristic plasma cells of myelomatosis. In the two cases of hyperproteinemia and hyperglobulinemia and hypoglobulinema there was abundant Bence Jones protein in the urine. In one case treatment with high voltage roentgen rays resulted in some improvement; in the other cases the treatment was without effect. In the terminal stage in all cases there was a moderate hypercalcemia, while the serum phosphate was normal. In two cases death occurred four and twelve months respectively after onset of the symptoms.